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Crop monitoring in Europe
May 2017

Dry and cold weather affects yield outlook
Rapeseed and spring barley now below five-year average

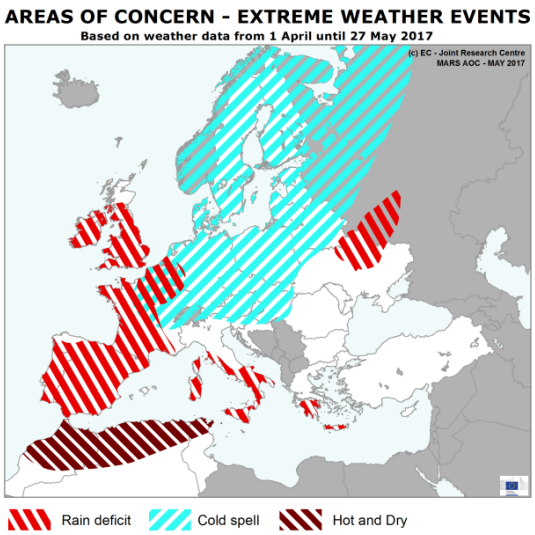
Yield forecasts for winter crops were revised downwards (by 2-3% at EU level) compared to the April Bulletin. They are now below the five-year average for spring barley and rapeseed but remain above the five-year average for wheat and winter barley.

Negative weather conditions hampered winter crop growth and development in several regions. In Spain, persistent dry conditions started to impact vegetative growth in *Castilla y León*, one of the most important barley-producing regions in Europe. In western France, durum wheat suffered from a persistent lack of precipitation, while winter barley and soft wheat were hampered by persistent low soil moisture and cold conditions in northern France, Luxembourg and southern Belgium. Dry weather conditions were also reported in Italy, the United Kingdom and Ireland, but so far with little or no negative impacts on the yield outlook at national level.

Unusually cold conditions occurred in large parts of western, central and northern Europe, affecting rapeseed flowering in Germany, central Europe and Poland.

Content:

The Bulletin covers the period from 1 April until 15 May



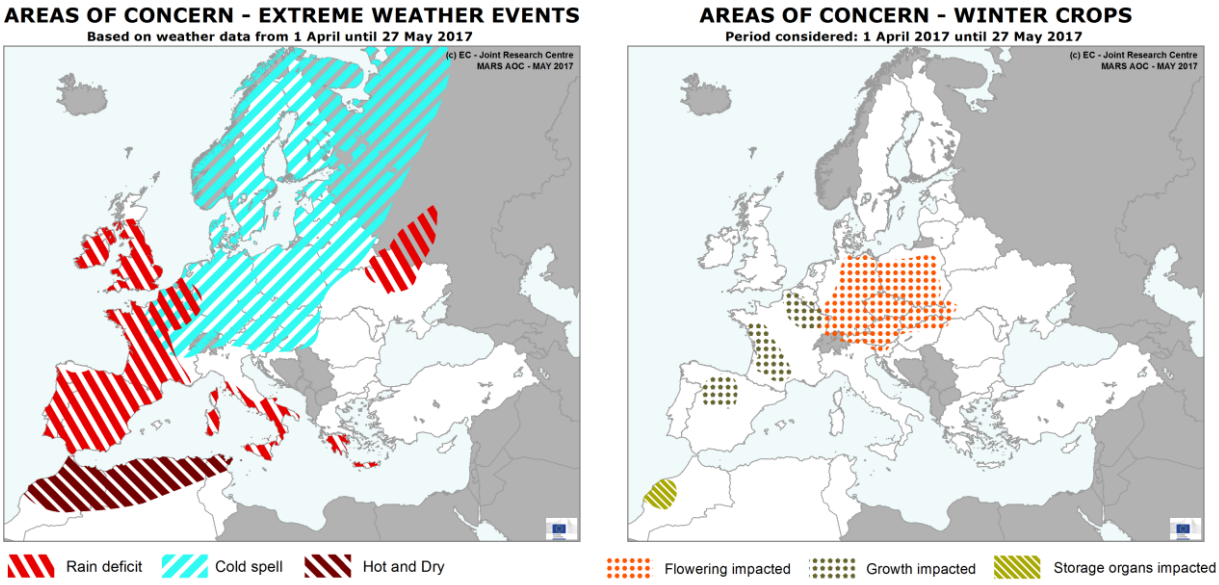
Crop	Yield (t/ha)				
	Avg 5yrs	April Bulletin	MARS 2017 forecasts	% Diff 17/5yrs	% Diff April
TOTAL CEREALS	5.30	5.48	**5.37**	+1.5	-2.0
Total Wheat	5.60	5.79	**5.66**	+1.0	-2.2
soft wheat	5.84	6.05	**5.91**	+1.2	-2.3
durum wheat	3.32	3.39	**3.34**	+0.6	-1.5
Total Barley	4.83	4.90	**4.76**	-1.5	-2.9
spring barley	4.23	4.21	**4.06**	-3.8	-3.6
winter barley	5.68	5.82	**5.69**	+0.1	-2.2
Grain maize	6.88	7.13	**7.15**	+3.9	+0.3
Rye	3.89	3.78	**3.64**	-6.3	-3.7
Triticale	4.20	4.21	**4.14**	-1.5	-1.7
Rape and turnip rape	3.25	3.27	**3.17**	-2.7	-3.1
Potato	32.5	33.4	**33.6**	+3.5	+0.7
Sugar beet	71.4	74.2	**73.9**	+3.4	-0.5
Sunflower	1.94	2.10	**2.14**	+10	+1.9

Issued: 19 May 2017

Joint Research Centre

1. Agro-meteorological overview

1.1 Areas of concern



Negative weather conditions hampered winter crop development in several regions, as shown in the above map. This 'Winter crops' map reflects the impacts that have occurred since 1 April. The first map depicts extreme weather conditions, some of which are responsible for the impacts in the second map. In **Spain**, persistent dry conditions have started to impact vegetative growth in Castilla y León, one of the most important barley-producing regions in Europe. Moreover, no rain is expected for the Iberian Peninsula in the coming days. In **Italy**, although dry conditions are observed in southern regions, this is currently not expected to impact durum wheat, which is now in the grain-filling phase. In **France**, in western regions, durum wheat suffered from a persistent lack of precipitation, while winter barley and soft wheat were hampered by persistent low soil moisture and cold conditions in northern parts of the country, as well as in **Luxembourg** and southern **Belgium**. Unusually dry weather conditions were also reported in the **United Kingdom** and **Ireland**.

Unusually cold conditions occurred in large parts of western, central and northern Europe in the period between mid-April and the end of the month. Low minimum temperatures affected rapeseed flowering in **Germany**, **central Europe** (the **Czech Republic**, **Slovakia**, **Austria**, **Hungary**, **Slovenia**) and **Poland**.

In **Morocco**, **Algeria** and **Tunisia**, weather conditions have been dry and hot since April. These conditions led to suboptimal crop growth in Algeria (as we reported in our April bulletin) and, in May, hampered the formation of storage organs in the Tensift region of Morocco.

1.2 Agro-meteorological review (1 April – 15 May)

Warmer-than-usual weather conditions prevailed in the Iberian Peninsula and western France, the Mediterranean region and the UK, with mean temperature anomalies of between 0.5°C and 2°C (between 2°C and 4°C in large areas of the Iberian Peninsula). Temperature sums (Tbase=0°C) in most of the Iberian Peninsula exceeded the long-term average by more than 100 growing degree days (GDD), while moderate positive anomalies in the temperature sums (mainly 20 - 80 GDD) occurred in Italy, Greece, Albania, Macedonia and Turkey. Maximum temperatures were mainly comprised of between 25°C and 30°C in western Europe and the northern Mediterranean region, with local maxima exceeding 33°C. In most of these areas, minimum temperatures remained above -5°C.

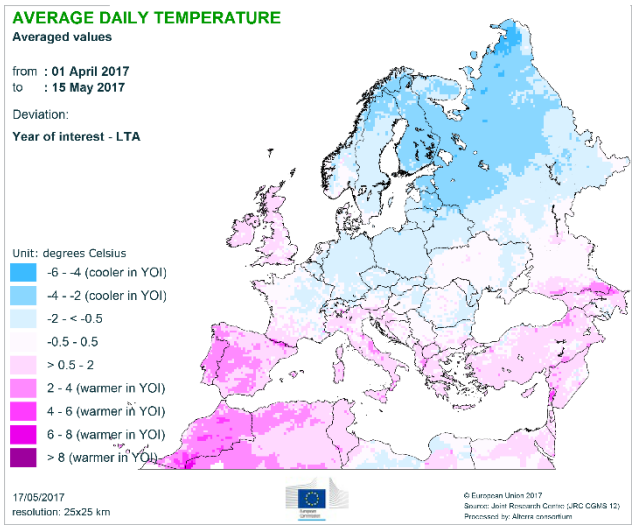
Colder-than-usual weather conditions prevailed in central, eastern and north-eastern Europe, with mean temperature anomalies comprised of between -2°C and -0.5°C (-4°C and -2°C in north-eastern Europe). Anomalies of the temperature sums (Tbase=0°C) in central Europe were mainly between -50 GDD and -20 GDD, whereas in eastern and north-eastern Europe, anomalies mainly ranged from -150 GDD to -50 GDD. Observed maximum temperatures were mainly between 20°C and 25°C in central Europe, and were well below 20°C in north-eastern Europe. Minimum temperatures were mainly above -5°C in central and eastern Europe (-20°C in north and north-eastern Europe).

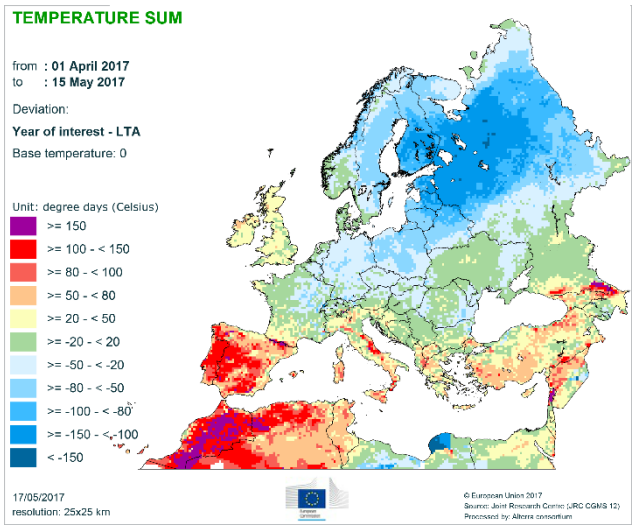
A **cold spell** in the second half of April affected central, eastern and north-eastern Europe as well as some areas of south-eastern Europe. Minimum temperatures ranged from -2°C to -5°C (locally -10°C). In north-eastern Europe, the lowest values were between -10°C and -5°C (-20°C and -10°C in the Scandinavian Peninsula and north-western Russia). A less severe cold spell occurred at the beginning of May, mainly affecting Poland, the Czech Republic, Slovakia (with minimum temperatures of between -4°C and -1°C) and north-eastern Europe (with minimum temperatures of between -10°C and -5°C).

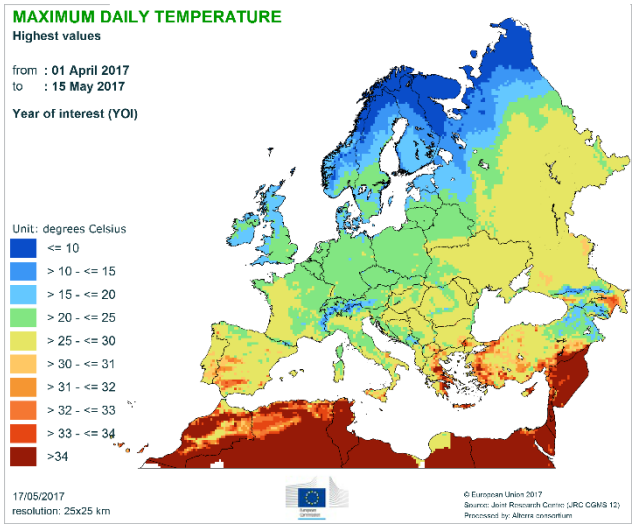
Drier-than-usual weather conditions prevailed in the Iberian Peninsula (where cumulated precipitation was mainly 20% to 70% of the long-term average), the UK (mainly 20% to 50%), large areas of western and north-eastern France as well as the Benelux countries, south-western Italy and Greece. Some areas of eastern Europe and the Scandinavian Peninsula also experienced drier-than-usual conditions. In all these regions, there were less than 3-5 days of significant precipitation (daily values greater than 5 mm) during the review period. Overall, these conditions induced a deficit of more than 60% in the climatic water balance w.r.t. the long-term average.

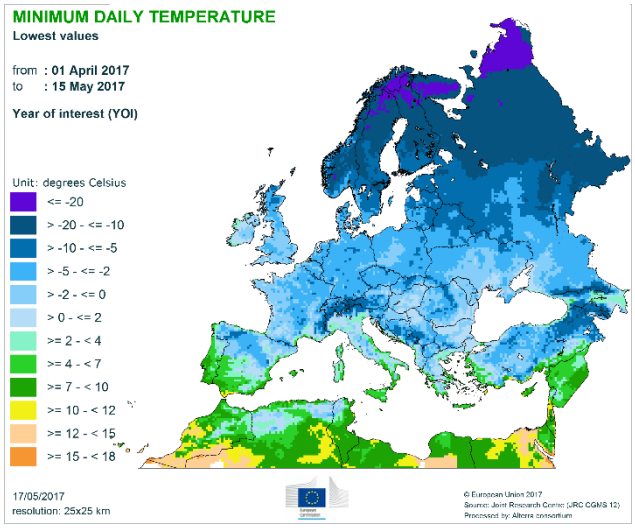
Wetter-than-usual conditions characterised some areas of central, eastern and south-eastern Europe, with water surpluses of mainly between 50% and 100%.

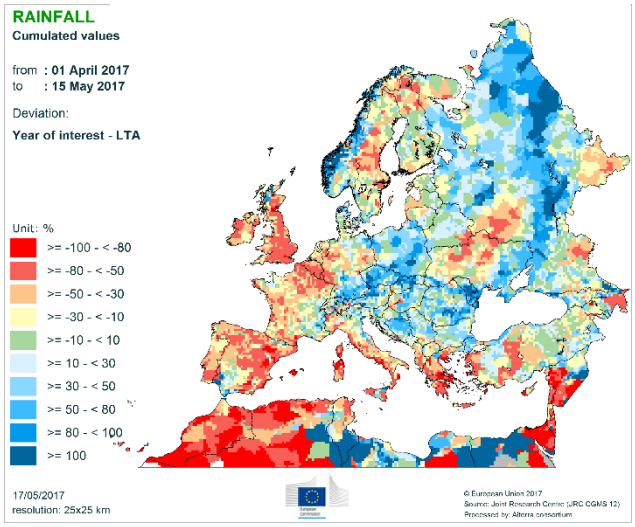
Large cumulated precipitation values (greater than 120 mm) were recorded in the period analysed, especially north of the Alps and in the north-western Balkans. where more than 10 days with daily precipitation above 5 mm were observed.

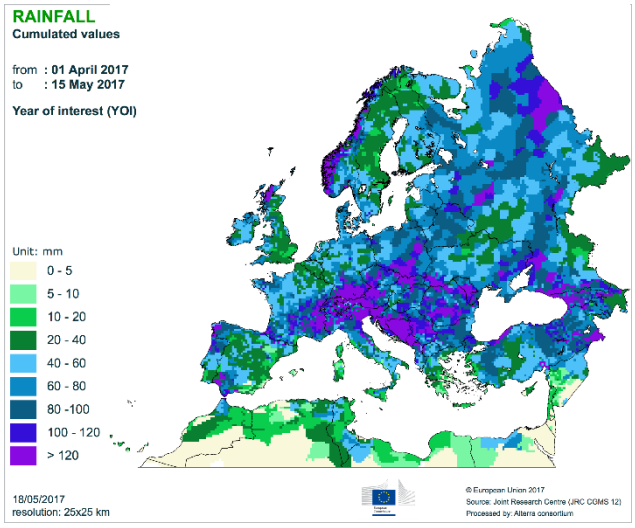


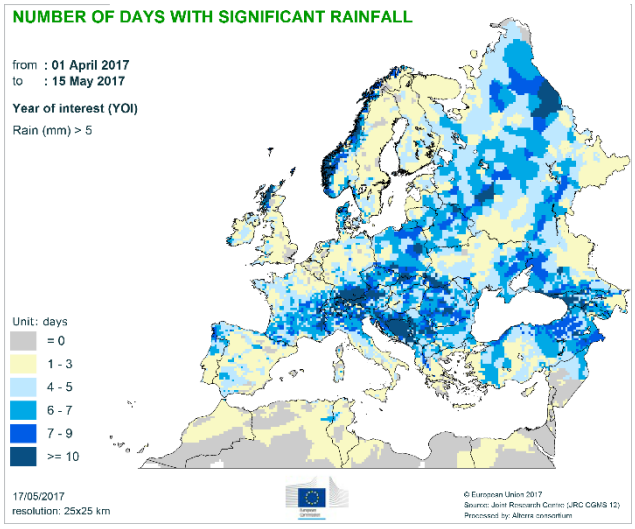


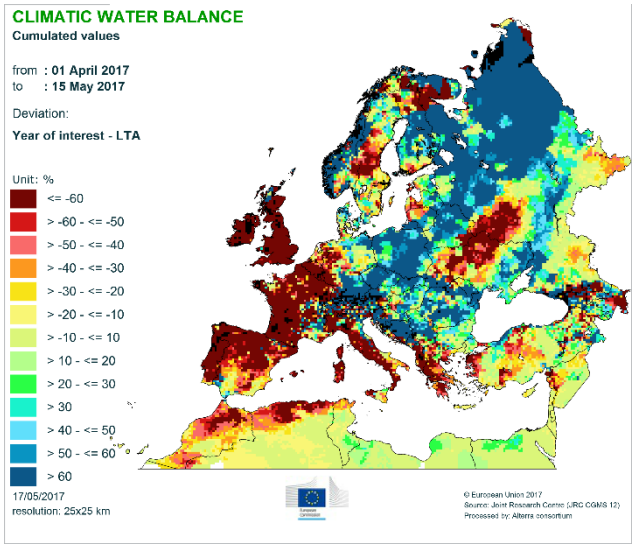












1.3 Weather forecast (19 – 27 May)

Large-scale atmospheric circulation will favour the flow of hot air masses to the Iberian Peninsula. A low pressure system, currently positioned west of the British Isles, will move eastward and dominate the weather in central Europe during the second half of the forecast period, bringing unstable conditions and frequent rainfall.

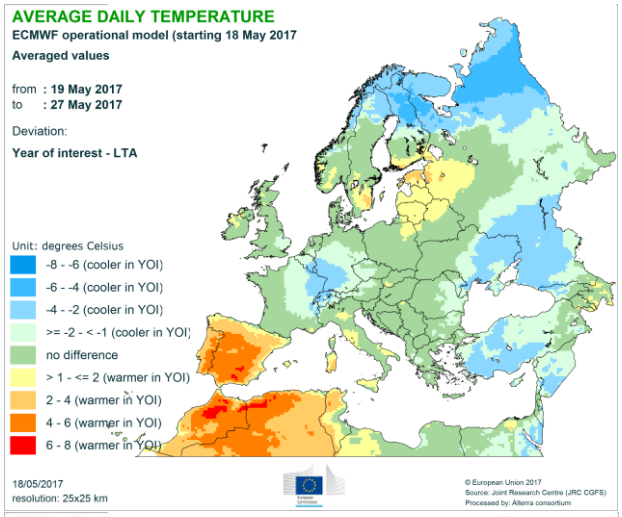
Colder-than-usual weather conditions are expected in parts of central and north-western Europe, eastern Ukraine, southern European Russia and Turkey. Temperature anomalies will be mainly comprised of between -4°C and -2°C.

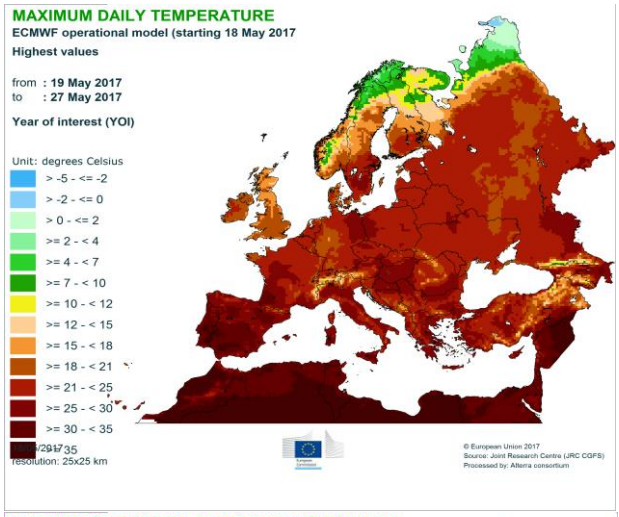
Warmer-than-usual weather will continue in the Iberian Peninsula, with temperature anomalies mainly of 2°C to 6°C above the long-term average. Maximum daily temperatures are expected to exceed 30°C in the central and southern parts of the peninsula and, during the second half of the forecast period, possibly also in the northern part of the Iberian Peninsula and south-western France. Another warm-weather anomaly is expected in the Baltic countries, although with much smaller temperature anomalies (< 2°C).

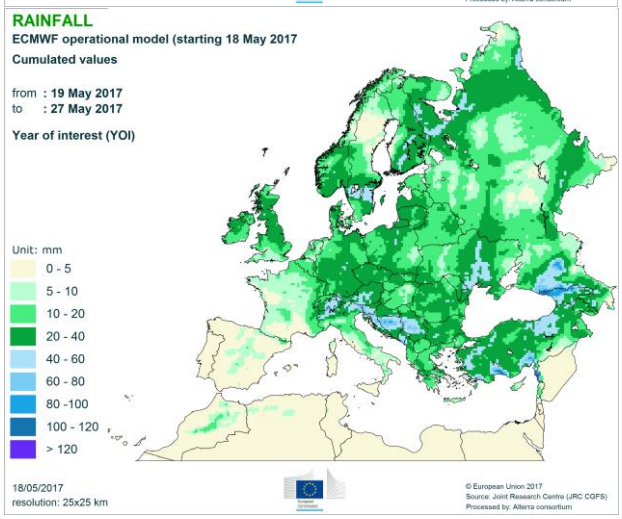
Dry conditions are foreseen for the Iberian Peninsula, south-western France, Sardinia, Sicily, parts of central Italy, and the Maghreb. Generally, less than 10 mm of rainfall is expected in the rest of France, southern Italy and large parts of central Russia.

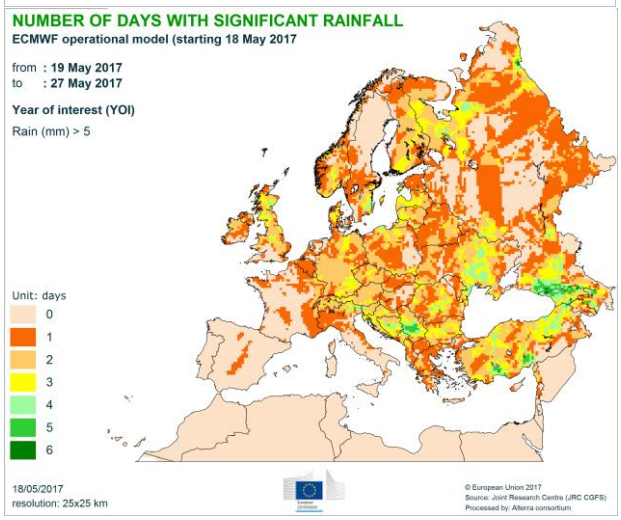
Rainfall cumulates of between 20 and 40 mm are forecast for a large part of central and south-eastern Europe. Cumulates of more than 40 mm are foreseen for the northern Adriatic areas, the western Alps, and eastern Black Sea areas.

Long-term weather forecast: In the coming three months (June to August) warmer-than-usual conditions are likely to prevail in most of Europe, most markedly in the Mediterranean region, the Iberian Peninsula and north-eastern Europe.



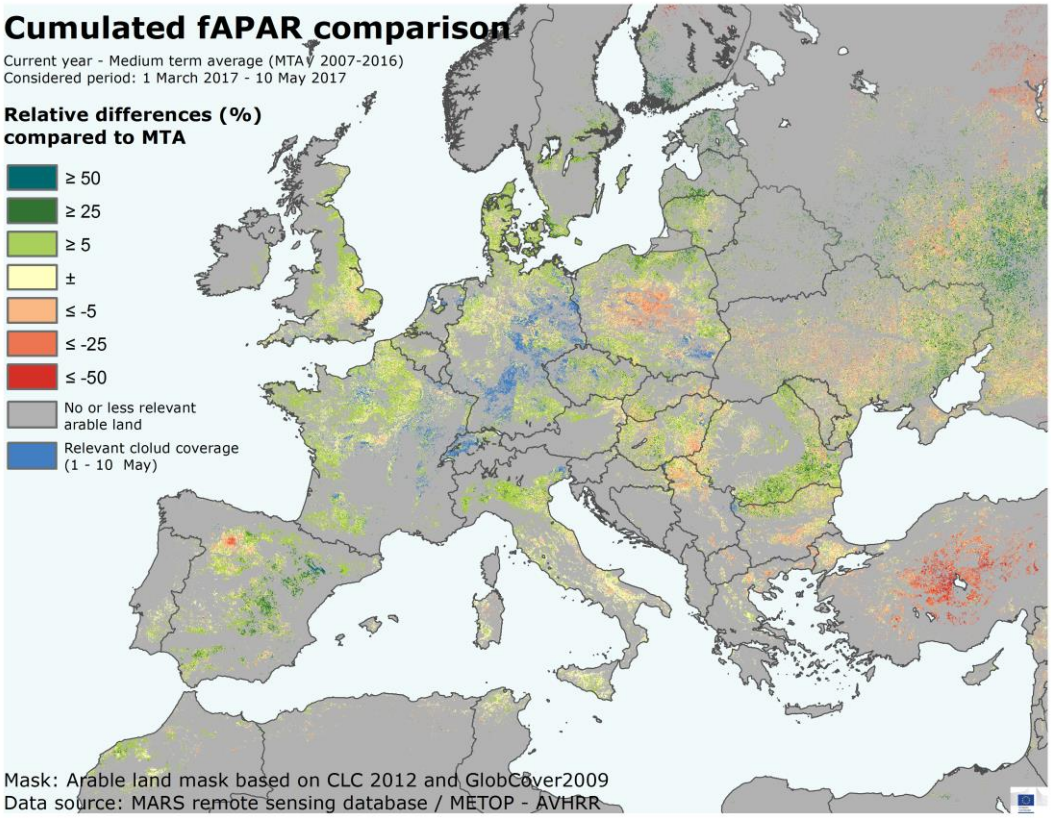






2. Observed canopy conditions by remote sensing

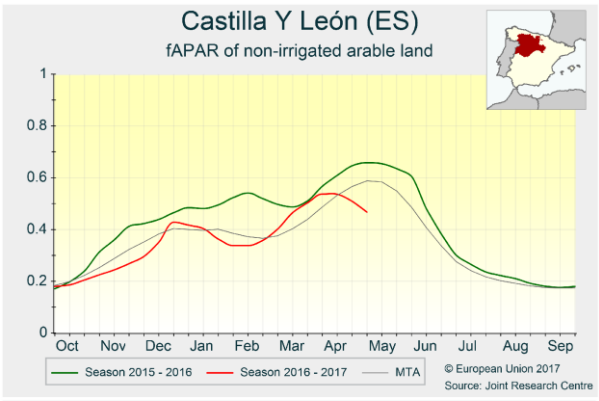
Cold April slows down biomass accumulation in eastern Europe

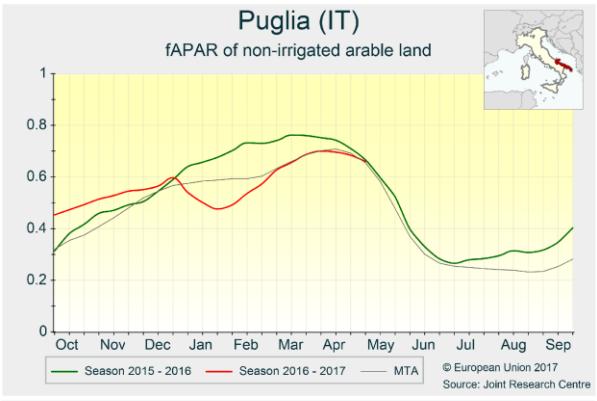


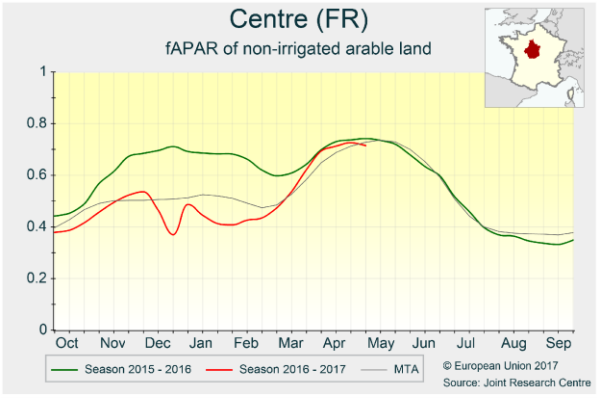
The map displays the differences between the fraction of Absorbed Photosynthetically Active Radiation (fAPAR) cumulated from 1 March to 10 May 2017, and the medium-term average (MTA, 2007-2016) for the same period. Positive anomalies (in green) reflect above-average canopy density or advanced crop development, while negative anomalies (in red) reflect below-average biomass accumulation or delayed crop development.

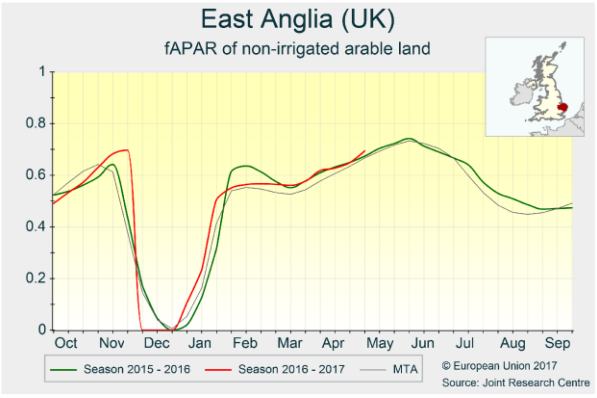
In **Spain,** the persistent lack of precipitation in April hampered canopy development, as reflected in the significant reduction in the fAPAR signal for Castilla y León. Winter crop conditions are much better in the rest of the peninsula, where they even show a strongly advanced phenological development. In southern **Italy**, durum wheat entered the grain-filling phase under fair conditions (e.g. Puglia), albeit with some concern due to below-average precipitation. In **France**, winter crop development is still advanced, despite the cold spell that occurred towards the end of April in the northern regions. This latter event overlapped with a dry period, which resulted in reduced photosynthetic activity around the flowering period (e.g. Centre). In the **United Kingdom**, although precipitation has been below average it was generally sufficient to sustain vegetative crop growth, and the leaf area development of winter crops is in line with average values (e.g. East Anglia). In **Germany**, **Poland** (e.g. Lodzkie), **Austria**, **the Czech Republic**, **Slovakia** and **Hungary**, spring and winter crop development was delayed due to several drops in temperature that occurred in April and the beginning of May. These conditions slowed down crop phenological development and reduced biomass accumulation, which, in several regions, is below average. Similar events occurred in the **Baltic** countries (e.g. Latvija) and **Belarus**. In **Romania** and **Bulgaria**, winter crop development is still advanced with optimal biomass development. The flowering stage is generally starting in Romania (e.g. Sud-Est), while it is almost ending in Bulgaria. In **Ukraine**, the winter crop phenological development is slightly advanced in eastern regions (e.g. Zaporiz'ka) and green biomass accumulation presents favourable conditions. In **Turkey**, winter crops are

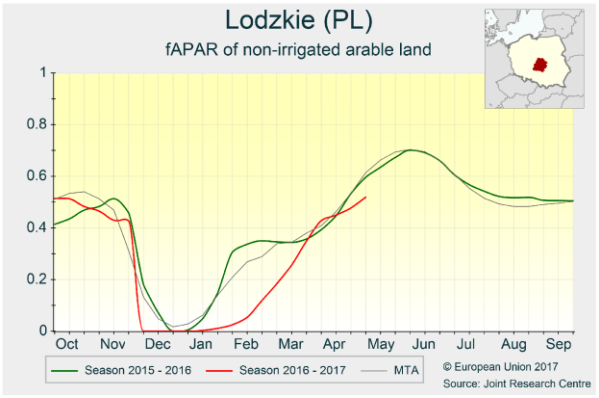
gradually catching up but still present strong delays in both phenological development and overall biomass accumulation.

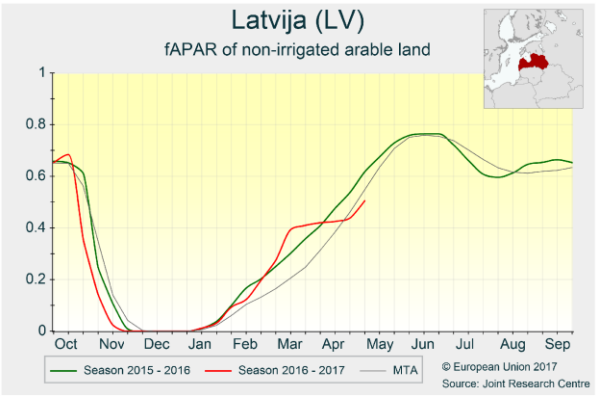


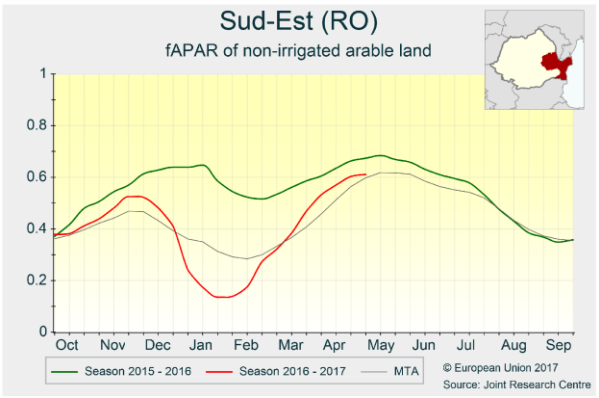


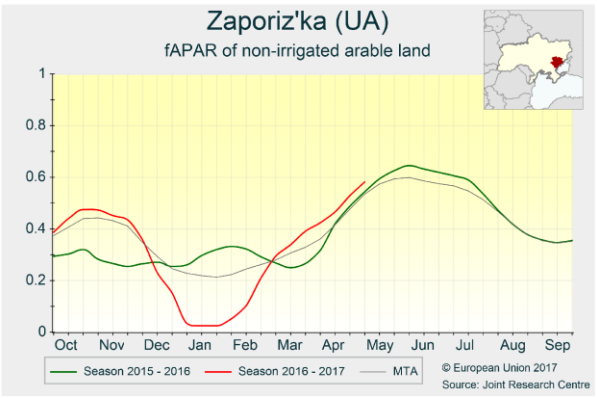












3. Country analysis

3.1 Sowing conditions

Spring barley

Spring barley sowing activities have been completed in most of Europe. Mild temperatures from February to mid-April favoured rapid emergence. In Finland and Estonia, the sowing campaign is expected to conclude by mid-May with no major interruptions. Dry conditions are limiting growth in some regions of Spain, France, the UK and Ukraine.

The late sowing of spring barley was completed at the end of February in Spain, the EU's largest spring barley producer. Barley is now in the flowering phase, and the crop status is average, except in *Castilla y León*, where conditions have been unusually dry since October. In that region, spring barley varieties are mainly sown in autumn-winter, and the dry conditions observed are significantly limiting growth. In France, the sowing campaign was concluded by mid-March. Mild temperatures since February favoured rapid emergence, about one week earlier than in 2016. The crop is in the tillering phase and, especially in the north-east (*Lorraine*, *Champagne-Ardenne*), the lack of substantial precipitation in April has negatively impacted crop growth. The sowing campaign has finished in the UK and Ireland. Rainfall was scarce during most of April, and this favoured a rapid progression of sowing activities in northern England and Scotland, where spring barley is now in the tillering phase. In the regions where the crop was sown in February-March (eastern England, Ireland), the dry conditions observed since April are affecting vegetative growth.

In Denmark, Germany, Poland and the Czech Republic, the sowing campaigns were concluded at the end of April, and the crop is in the early tillering phase. Temperatures have been lower than usual since mid-April, and this has slightly delayed crop development. In general, soil moisture is adequate thanks to fairly average precipitation since February.

In Sweden, Latvia and Lithuania, the sowing campaign has finished with no significant interruptions, whereas in Estonia and Finland the late sowing activities will conclude by the end of May. As temperatures have been below seasonal values since the end of April, barley will complete the emergence phase by the end of May, slightly later than usual.

In Ukraine and south-western Russia (*Volgograd*, *Saratov),* the sowing campaign had ended by the end of March and the crop is now in the heading phase. Overall, crop conditions are satisfactory except in central Ukraine (*Cherkavska*, *Kirivohrdaska*), where low soil moisture is constraining plant growth. Spring barley sowing activities have just concluded in the central-western regions (*Ulyanov*, *Tatarstan*), and the crop is now emerging.

Sugar beet and potatoes

Meteorological conditions have been adequate for the sowing of sugar beet and potatoes in most of Europe until mid-April, but a subsequent cold air inflow, accompanied by abundant precipitation (sometimes in the form of snow), interrupted sowing activities in the third dekad of April and caused delays to emergence and local damage to emerged stands.

Above-average temperatures until mid-April led to the early warming of the topsoil, allowing for an early start to the sugar-beet sowing campaign in southern and western regions of Europe. Precipitation was mostly below average and infrequent, providing good sowing conditions within and even ahead of the normal window. In France, considerable rainfall in the second half of March locally interrupted sowing activities, primarily in the *Champagne-Ardenne*, *Centre* and *Haute-Normandie* regions. In the main sugar-beet-producing regions of Germany and Poland, the sowing of sugar beet went well due to the scarce rains, but the weather turned cold and wet after 17 April, hampering sowing activities and delaying sprouting and emergence. Sowing was advanced and free of major difficulties in most of the UK, the

Benelux countries, Austria, Hungary, Slovakia and Croatia. In the Carpathian Basin, dry (locally very dry) topsoil hampered early emergence in many regions, but water supply was adequate since the last dekad of April.

In Romania, overly wet conditions caused delays in March, but the situation improved considerably in early April. In Italy and Turkey, extensive dry periods supported the timely sowing of sugar beet, and spring precipitation later enabled proper germination and early crop development. Weather conditions have also allowed for the timely start to and good pace of sowing in Ukraine and Russia.

The cold air intrusion in mid-April caused frost events (with temperatures of -5°C and even lower at the soil surface) in a wide belt between France and the Black Sea, including Germany, Poland, the Czech Republic, Austria, Slovakia, Hungary and most of the Balkan Peninsula. A second frost event hit Poland and northern part of Ukraine around 10 May. The most severe frost events caused local damage to seedlings, but this is judged to be generally limited.

The sowing conditions described for sugarbeet largely also apply to potatoes, which are usually sown a few weeks later, in roughly the same regions. The sowing campaign made a good start and early varieties had already been sown by mid-April in most regions. The main sowings had just started when the cold-spell kicked in, hampering further progress in large parts of central and eastern Europe until the first or second week of May. Impacts of the cold spell seem to have been limited, as recently sown crops that have not emerged yet are protected by the overlying soil. Early-sown crops that had just emerged were vulnerable to frost damage but farmers are well aware of the risk and often use plastic sheets to protect young stands. Even if damaged, potatoes have a strong ability to recover. In any case, the cold spell will imply a delay of up to several weeks.

Maize

The sowing campaign is almost complete under generally good conditions in Spain and France, and advanced in Italy after initial delays due to drought. Germany, Poland and Belarus experienced delays due to cold temperatures and abundant precipitation. Minor frost damages to stands in the first phases of development are reported in Italy, Romania and Hungary.

The sowing of maize has almost finished in southern Europe. In Spain, very good conditions were generally observed for the sowing and early development of maize. Maize is already at the stage of 5-6 leaves in Andalucía. In the Ebro Valley, the sowing campaign started in the second half of April under optimal conditions. In France, maize sowing operations are almost finished and well advanced compared to past years. On 11 May, 93% of the maize area had been sown, which is 20% more than in 2016 and seven days in advance compared to the past five-year average (Source: FranceAgriMer Céré'Obs service). In Italy, sowing operations are quite advanced. Precipitation since the end of April improved the persistent drought situation described in the last bulletin, and maize was sown in areas where sowing had been delayed due to dry soil conditions. In the areas where maize was already sown, phenological development is around 5-6 leaves. In several provinces of northern Italy, a cold spell in the second half of April caused frost damage to the leaves of the plants that had already emerged (at the 2-3 leaves stage). It is still too early to estimate the gravity of the problem. However, in most cases, the vegetative apex should not have been affected and the plants should have resumed their development.

Towards the north (i.e. Germany, Poland and Belarus), sowing activities started in the second dekad of April but stopped abruptly due to cold conditions and abundant precipitation, which substantially delayed sowing operations. Minimum temperatures dropped below zero again during the first half of May. In these areas, sowing operations have slowly resumed during the past few days.

In Hungary, sowing operations proceeded rapidly this year. Progress was at 80% at the beginning of May, and the sowing campaign should be almost finished by the time of publication. In Romania and Bulgaria, sowing operations are almost finished. Minor frost damages were reported in Romania and Hungary, but these are not expected to have a substantial impact on production.

In Turkey, sowing operations are well advanced (including in central areas) after a delayed start due to unfavourable conditions in mid-April.

Sunflowers

Sowing activities were advanced in Eastern Europe, given the beneficial above-average temperatures during spring. In Italy and Spain, particularly in the main crop-producing regions, soils remained dry, which prevented plants from germinating and hampered field work.

In Romania, Bulgaria and Hungary, sowing activities were completed early, and sunflower stands benefited from good conditions despite the cold spell that slowed development during the last dekad of April. In Ukraine, sowing activities are almost complete thanks to the above-average temperatures observed since the beginning of May. In France, conditions are variable. The early sown sunflower crops benefited from sufficient soil moisture to germinate. The cold spell observed at the end of April interrupted sowing and slowed down the germination of the seeds that had just been sown. At the beginning of May, some rainfall was observed and temperatures returned to average, allowing farmers to complete their sunflower sowing activities. In Italy and Spain, conditions are critical in the main producing regions (Toscana and Castilla y León). No rainfall was observed during the usual sowing windows, preventing seeds from germinating and making them vulnerable to pests. In Castilla y León, average temperatures remained below 5°C during the last week of April, interrupting growth and germination. The unfavourable conditions observed in Castilla y León are compensated for by beneficial conditions in Andalucía, which experienced sufficient rainfall and optimal temperatures. In Italy, some rainfall and beneficial temperatures have been observed since the beginning of May, which allowed farmers to restart sowing activities, but more rain will be needed to replenish water supplies for the coming months.

3.2 European Union

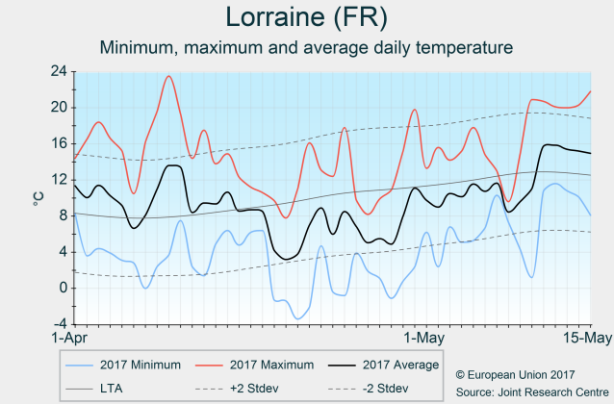
France

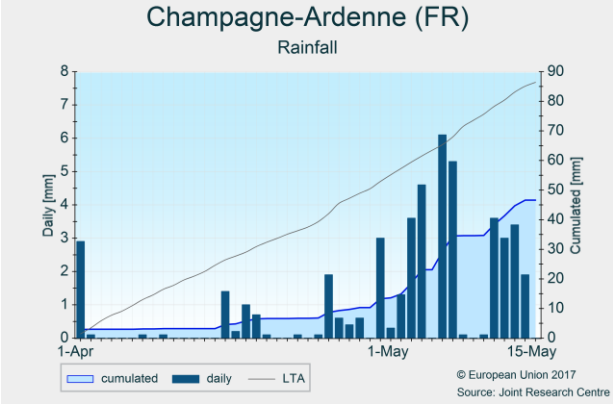
Winter cereals conditions deteriorated

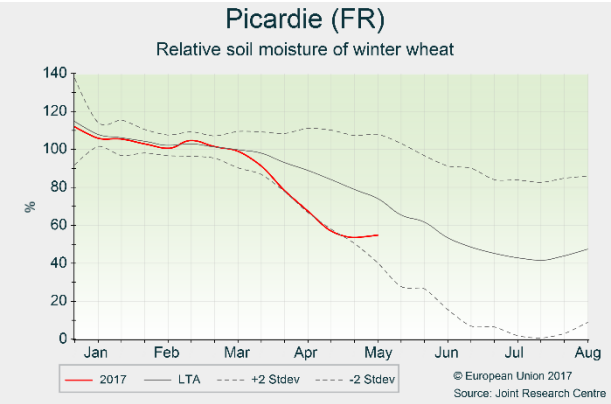
The low soil moisture levels due to poor winter precipitation were worsened by dry conditions in April. The drought affected most winter crops. At the end of April, a cold spell negatively impacted winter barley in the northern half of the country. The outlook for winter cereals is negative due to the drought. The impact of the cold spell on winter barley remains quantitatively uncertain.

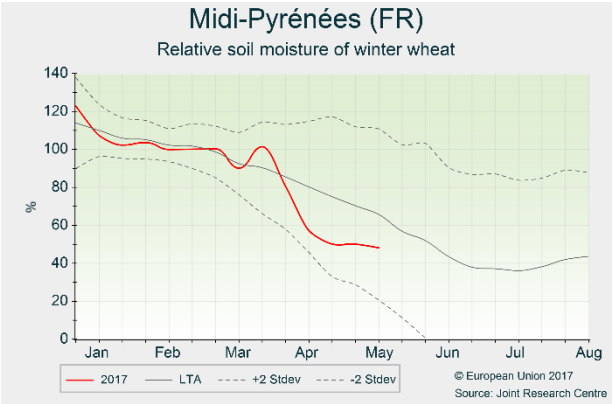
Conditions for winter cereals deteriorated substantially since mid-April. No substantial rainfall was observed during the entire month, while a rain deficit since last autumn has persisted in the northern half of the country, as reported in the April Bulletin. Winter cereals have been impacted by water stress, and the low soil moisture levels also reduced the accessibility of nitrogen to plants. The dry conditions also affected spring barley sown in March. The rainfall observed since the beginning of May is beneficial but insufficient to fill the soil water deficit. Crops are most unlikely to recover from the damage caused by water stress, but the latest rains will sustain the growth at least until anthesis.

At the end of April, temperatures decreased sharply and minimum temperatures reached -4°C in north-eastern regions. The cold spell impacted the most advanced winter cereals which had already developed their ears, mostly winter barley in the north-east. However, the quantitative impact of the cold spell on yields is uncertain as the losses strongly depend on the phenological stage, varieties and local variations in minimum temperatures. Rapeseed was flowering and the cold temperatures affected the plants that were in poor condition. The rain observed since the beginning of May will allow plants to compensate some of the losses, forming new flowers and pods, so a yield close to the average is still possible. Grain maize, sunflower, sugar beet and potato growth were interrupted by the cold temperatures for a few days, but no damages were reported. The outlook for these latter crops will depend on rainfall during the coming month.









Germany

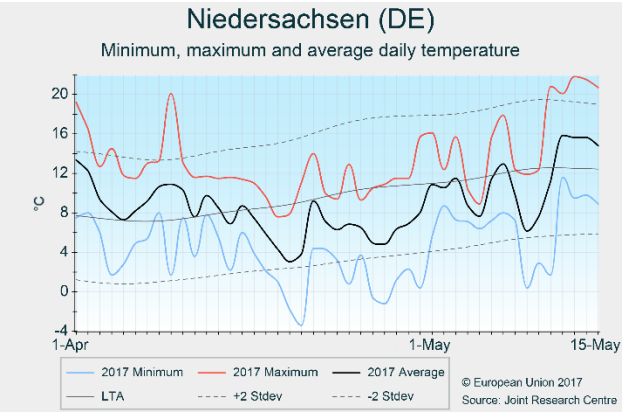
Rapeseed outlook revised downwards

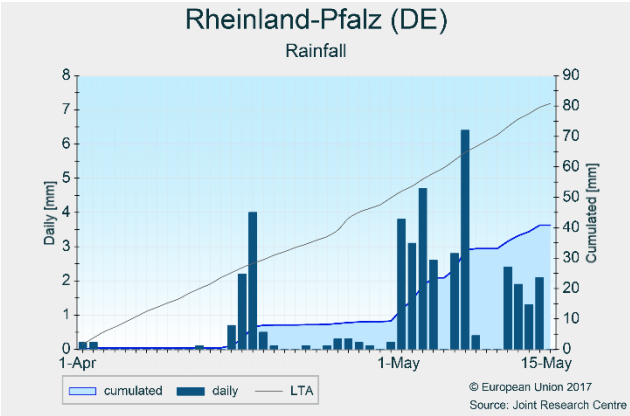
A cool period starting in mid-April brought the advanced crop development back to normal levels. The dry period in the east has come to an end, but more rain is needed in the centre-west, especially in Rheinland-Pfalz and Saarland. Rapeseed yields were revised downwards, due to previous dry conditions in the east, and cold spells after mid-April.

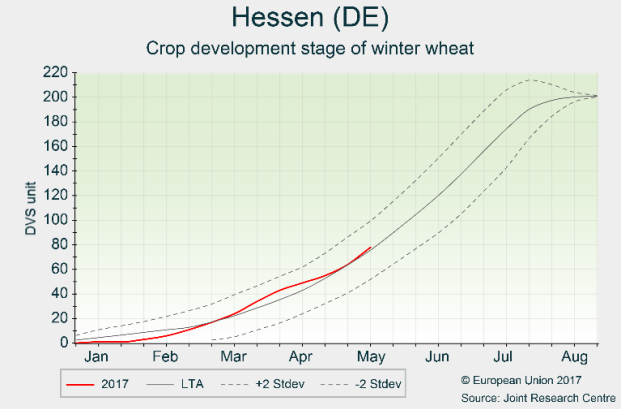
After a warmer-than-usual first half of April, a cooler period set in that lasted until 11 May. Temperature sums for the observation period are generally below average, and crop development (which was previously advanced) is back to normal levels. Several night frosts occurred around 20 April, the end of April, and around 9-10 May. Generally, the southern half of Germany was exposed to more frost days (regionally 5-10 days) than the north (0-5 days). Frost damages were reported, in particular for fruit trees and berry plantations, rapeseed and maize, although it is difficult to make a quantitative estimate at this stage. The frost damage to annual crops is most pronounced for rapeseed, where many of the early flowers were lost.

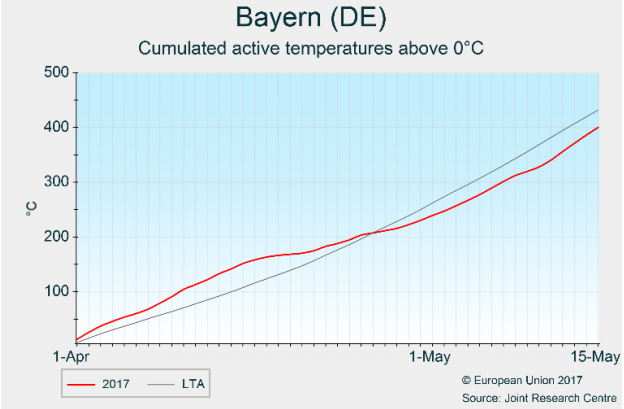
The previous dry conditions were alleviated in most regions, but more rain is needed in the centre-west and *Nordrhein-Westfalen*, and particularly in *Rheinland-Pfalz* and *Saarland*. Radiation was consistently lower than usual after mid-April, especially in eastern Germany.

Rapeseed yield expectations are mediocre due to unfavourable meteorological conditions during parts of the flowering stage and due to the previous dry conditions in the east of the country. No major handicaps in terms of frost, pest or disease have been identified for winter and summer cereals so far. Cereal yields in the centre-west will not reach record values, but yields close to average may still be possible if the critical soil humidity situation improves in the coming days.









Poland

Cold temperatures and precipitation creating problems for all crops

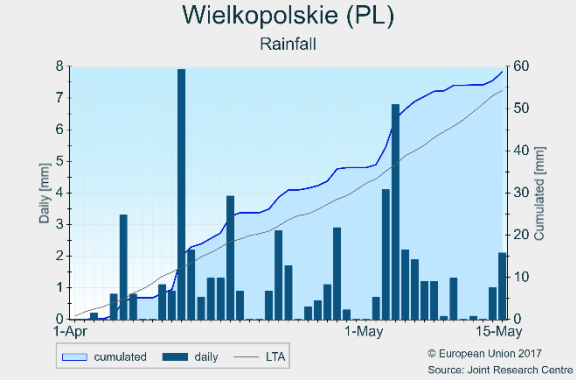
Precipitation and cold temperatures slowed the development of winter cereals, caused damage to rapeseed, and are delaying the sowing of maize.

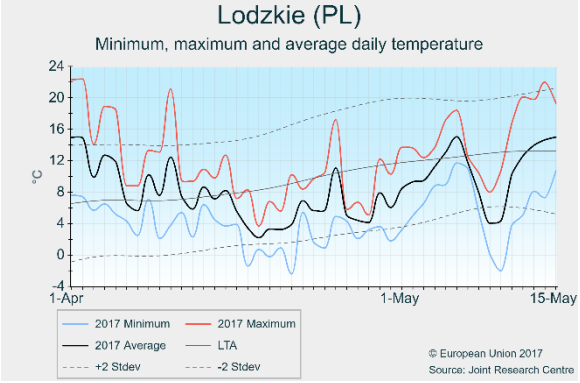
Continuous precipitation and cold temperatures around or below zero from the end of April until the second dekad of May created problems for all crops. Furthermore, the wet conditions and increased temperature of the past few days are conducive to disease development.

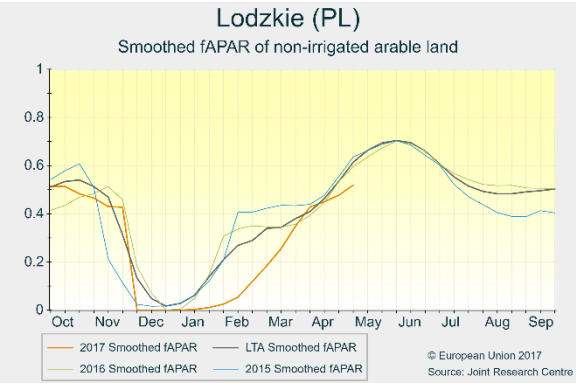
Winter cereal development was slowed down, and the yellowing of leaf tips was sporadically reported. However, winter cereals still did not reach the critical development stage of flowering. Our model shows a slowdown in development and biomass accumulation, but no critical situations. This is also confirmed by field observations. Hence, our forecasts for winter cereals were very slightly reduced compared to the trends. The conditions over the next weeks will determine the potential of winter cereals.

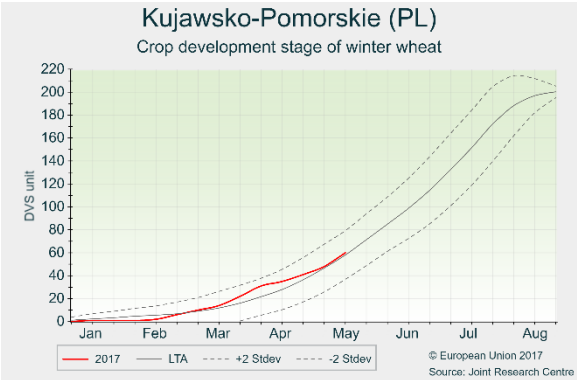
The combination of cold temperatures and almost continuous precipitation (with 3 to 12 more days of more than 5 mm rainfall compared to the LTA) have prevented summer crop sowing activities. Plants have not emerged in some of the areas where maize was sown early (beginning of April). The increase in temperature observed during the last few days improved the situation, but continuous precipitation could further delay sowing activities. Hence, the sowing of summer crops is being significantly delayed. For the moment, our forecast for grain maize is still based on trend, but the situation needs to be monitored.

The cold spell hit rapeseed plants in almost all of the producing regions, when plants were just coming to the flowering stage. Damages to buds and stems have been reported, which could also make the plants more sensitive to disease. Hence, our yield forecasts for rapeseed were reduced.









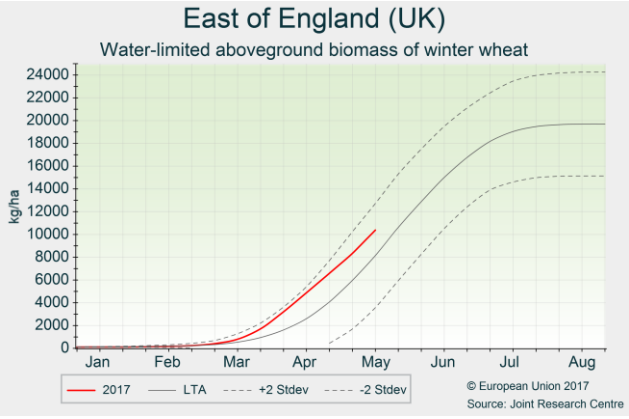
United Kingdom and Ireland

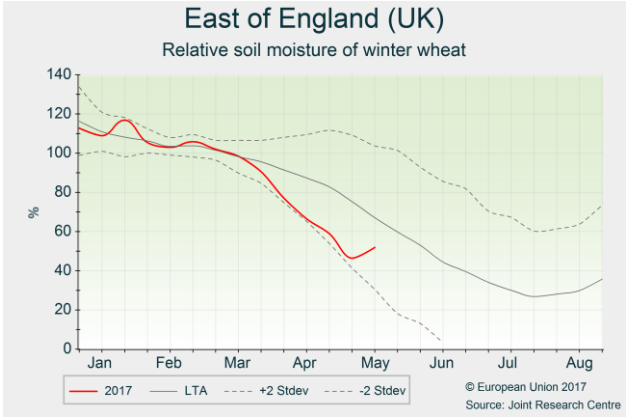
Positive outlook for winter crops, but more rain needed in the south-eastern UK

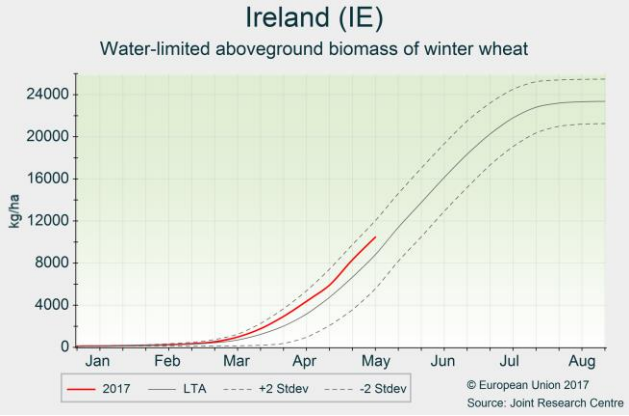
Winter crops are generally faring well, despite a pronounced rain deficit, especially in the important cropping regions of the south-eastern UK. Overall, the yield outlook is positive, but more rain is needed to sustain high yield potentials.

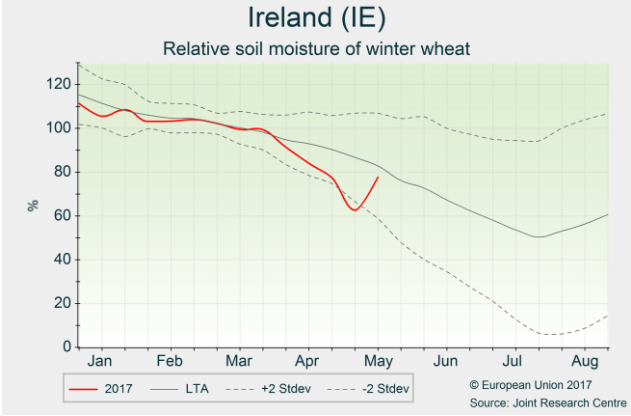
Rainfall has been well below average in all agricultural areas of the UK and Ireland. The deficit continues to be most pronounced in the southern and south-eastern UK - the UK's most important cropland region - which received little significant rain from 21 March until the end of the current review period. Above-average temperatures prevailed during the first half of April. Since then, temperatures fluctuated around the average, or slightly below.

Despite the pronounced rain deficit, winter crops have performed quite well so far, as inferred from remote sensing information and crop model simulations. Only the most affected areas and crops on sandy, shallow or compacted soils present clear evidence of water stress. Moreover, substantial rain expected at the end of the review period is likely to alleviate the most imminent water constraints. Pest and disease pressure is relatively low. Statistical comparison with historical years also suggest a positive yield outlook. More rain will be needed, however, to sustain stress-free growth during the flowering and yield formation stages. Development of spring crops has also been hampered in the drought-affected areas, but is likely to take off as soil water conditions improve. The yield forecast for winter crops was revised slightly upwards. For spring-sown crops, the forecasts are maintained at the historical trend or the five-year average.







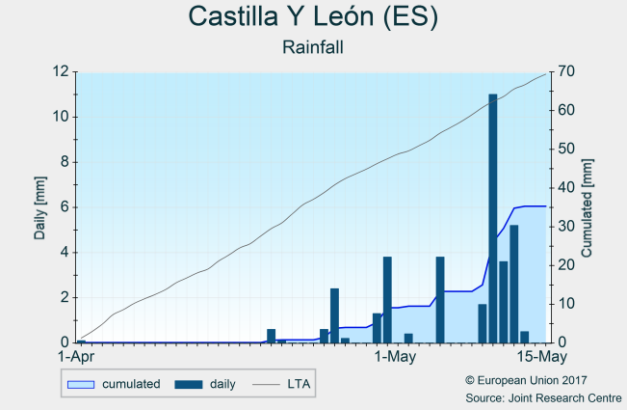


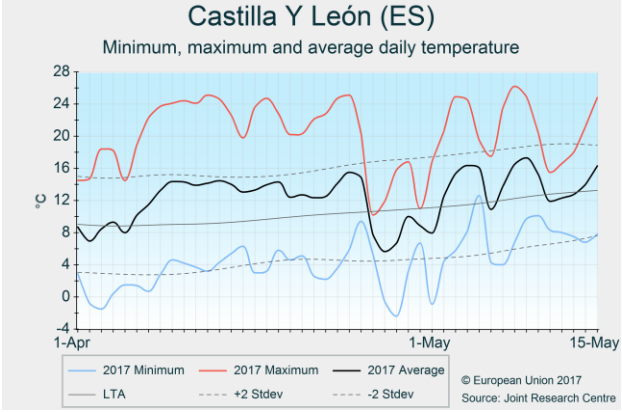
Spain and Portugal

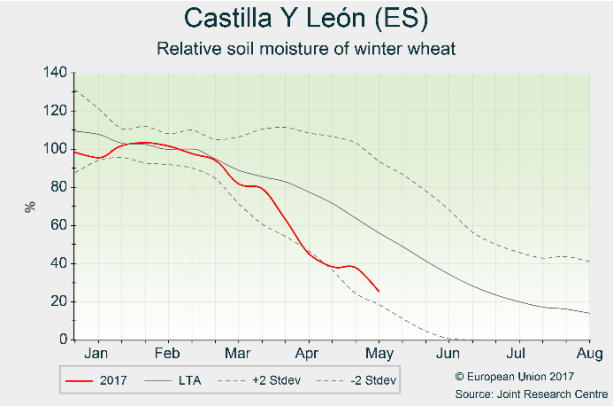
Winter cereal yields affected by water stress

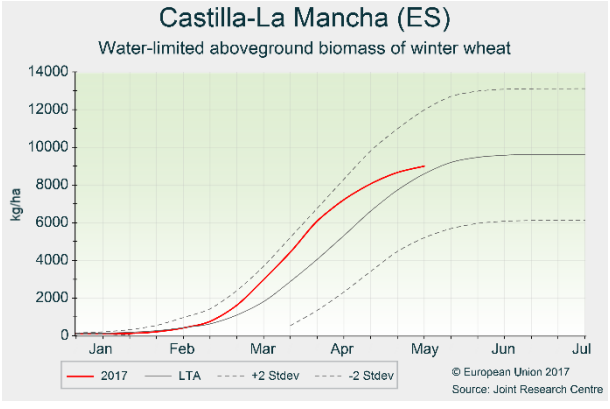
Rainfall during April was among the lowest of the past two decades in the northern half of the Iberian Peninsula. As winter cereals in Spain are water-stressed, especially in Castilla y León, their yield forecast was revised downwards. Summer crops are starting vegetative growth, and the outlook is average.

In the northern half of the Iberian Peninsula (Castilla y León, Aragón, Centro), cumulated precipitation during the month of April was less than 20 mm, among the lowest of the past 20 years. Substantial rainfall was only registered the second week of May. The first half of April was also rather dry in the south (Andalucía, Castilla-La Mancha), but this was followed by a period of above-average precipitation until mid-May. Temperatures in April-May were persistently 2-3°C higher than usual across the Peninsula, with the exception of a cold period from 27 April to 1 May, when daily minima fell below 0°C in some areas of Castilla y León and Castilla-La Mancha. The dry conditions in April and early May reduced yield expectations for wheat and barley in Spain. Castilla y Léon, where soil moisture was exceptionally low, is the most affected region. There, the recent rainfall arrived too late to prevent damage to crops, and they exhibit a sharp decrease in photosynthetic activity, as inferred from satellite imagery, indicating a significant reduction in yield potential. The status of winter crops is average in Andalucía, Aragón and Castilla-La Mancha, where dry conditions were less severe than in the north-west. Wheat and barley are now maturing in Portugal, and yield expectations are close to those of previous years. The vegetative growth of sunflowers is above the long-term average in the northern half of the Peninsula, thanks to the precipitation registered in mid-May, which also favoured the adequate emergence of grain maize.









Italy

Winter cereals probably not affected by drought

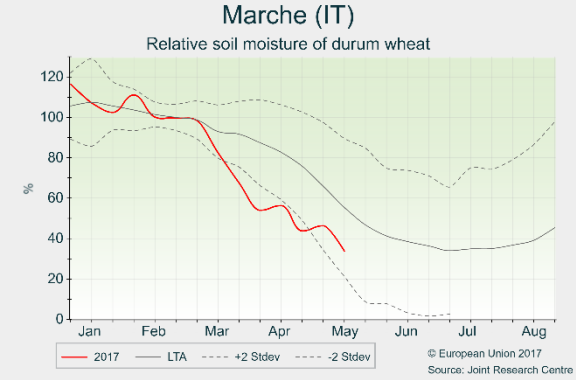
Dry conditions and the cold spell in northern Italy had no serious impact on winter cereals. Frost damage in early-sown grain maize is not expected to have significant consequences for the future development of the crop.

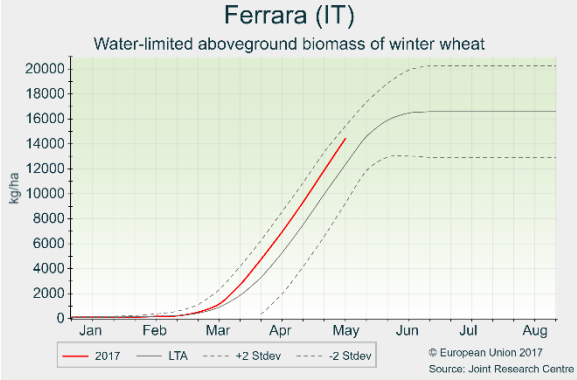
Rain arrived in northern Italy, in the last week of April, while the west coasts of the peninsula and western Sicily are still facing very dry conditions. In Tuscany, drought conditions are creating problems for sunflower germination.

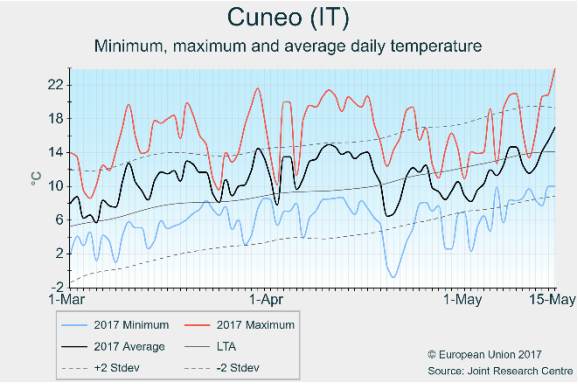
The cold spell at the end of April slowed the development of winter crops. The leaves of early-sown maize plants suffered frost damage in northern Italy. However, the vegetative apex should not have been affected, and the potential for good yields was not significantly reduced as plants still have time to recover. In the most severely affected areas, maize was re-sown.

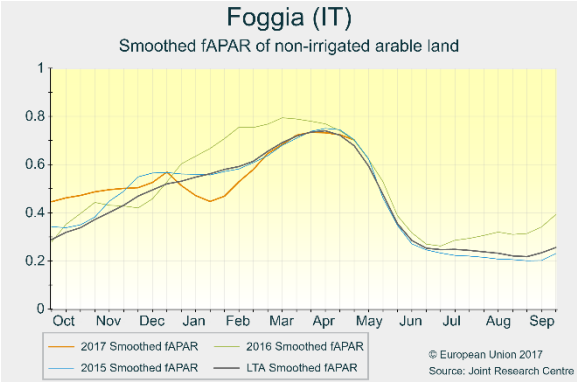
Winter cereals are at the flowering stage in northern regions and at the milky stage in southern regions. According to remote-sensing indicators and local sources, they most probably have not been significantly affected by the dry conditions in the most important producing regions. Yield forecasts were based on a scenario analysis, and are slightly above the trend.

The negative difference in remote-sensing indicators that can be observed in some areas of the regions where durum wheat is cultivated (*Toscana, Marche, Avellino*) is due to a slight delay in development. This is mainly due to the cold temperatures recorded in January and April, and probably also to the low soil-moisture levels. These conditions have not had a serious impact on yield potential, which is still good in *Sicilia* and *Puglia*, but could slightly reduce production at the national level. Hence, our new forecast is slightly reduced compared to the trend.









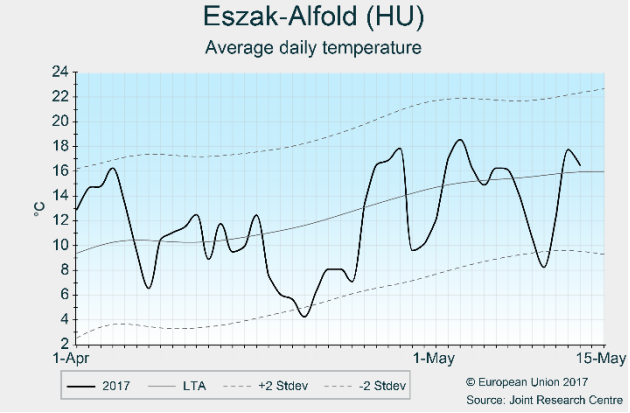
Hungary

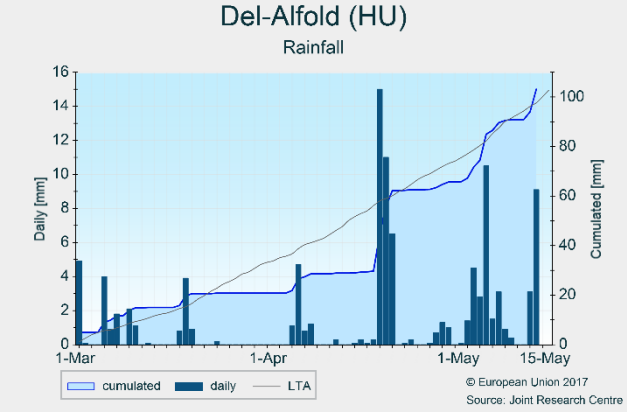
Improving soil moisture supply

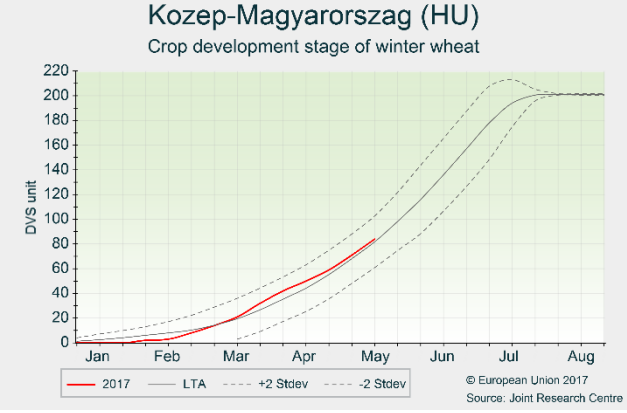
Thermal conditions have been very variable. Two cold spells occurred in the second half of April, without causing significant damage to arable crops. Near- or above-average precipitation benefited winter crops. Leaf area expansion and biomass accumulation are now adequate for mid-May, but yield expectations are still around average.

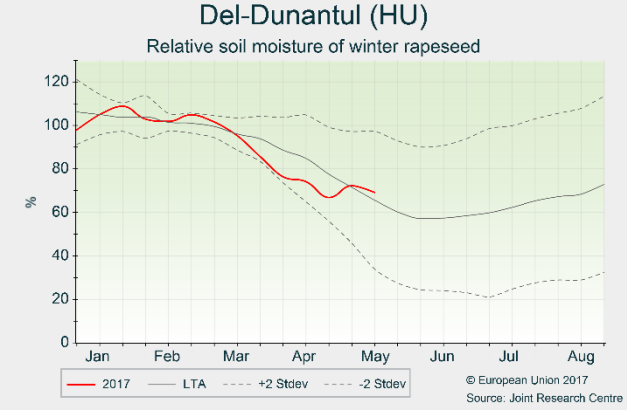
During the period of review (1 April – 15 May), overall thermal conditions have been near average, but daily temperatures fluctuated significantly around the long-term average. Considerable cold spells occurred between 16 and 25 April and around 10 May. Daily temperatures were 4-6°C colder than usual during these periods, and moderate frost events (typically Tmin>-3°C) were also experienced. After the dry period of late March and early April, rain became more frequent, resulting in near- or above-average precipitation sums for the period as a whole. Parts of *Dél-Dunántúl* and *Közép-Dunantúl* regions remained drier than usual, however, with moderate (30-40 mm) rainfall.

The development stage of winter crops is moderately advanced thanks to the very mild weather conditions of March. The flowering of rapeseed started in mid-April. Insect activity and pollination was limited during the cold spells, but frost damage is considered to have been local and moderate. At the beginning of April, the soil moisture content was typically below average (spring drought), but this situation improved considerably. In the last dekad of April, the sowing of maize and sunflowers was delayed due to excessive precipitation and unusually low soil temperatures. The development of spring and summer crops was delayed, and early growth is less than optimal. The leaf area expansion and biomass accumulation of winter crops seems to be recovering after the difficult winter and dry spring, but there are considerable local differences. The yield forecast for winter crops is based on a statistical comparison with similar years, and is still close to the five-year average.









Romania

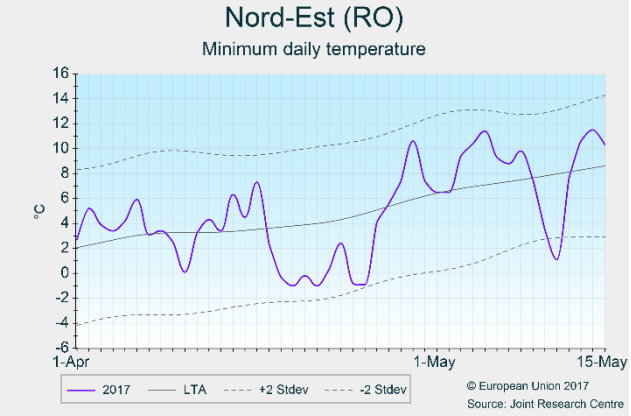
Fairly positive outlook for winter cereals

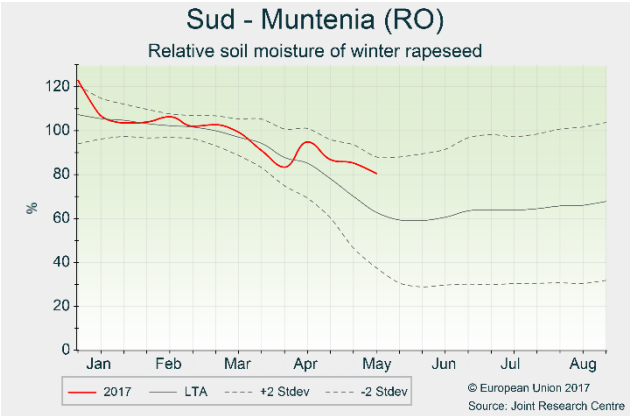
A cold spell accompanied by frost and snowfall negatively affected crop growth in the second half of April. Precipitation was above average during the review period. The biomass accumulation of winter cereals is above average in the southern and eastern territories, but it is more moderate in the western regions.

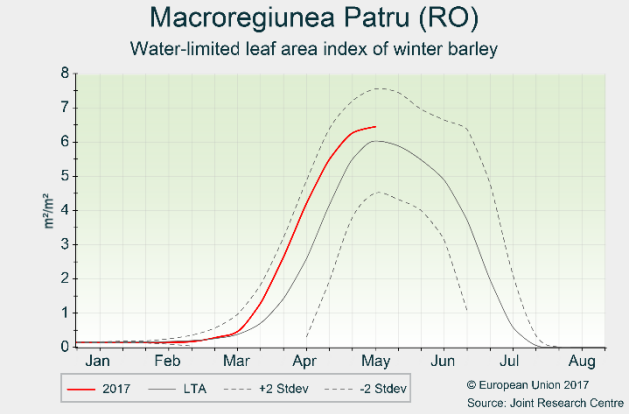
The first half of April was characterised by near- or slightly above-average thermal conditions and scarce precipitation. Around 18 April, an extreme cold wave arrived resulting in frost events (with temperatures as low as -4°C in the lowlands) and fall of heavy snow. This cold spell lasted until the end of April, when it was followed by a warmer period with positive thermal anomalies of 1-3°C (most markedly in central areas). Around 10 May, temperatures suddenly dropped again, but only mild local frost events occurred. Rainfall remained frequent and substantial in the first half of May.

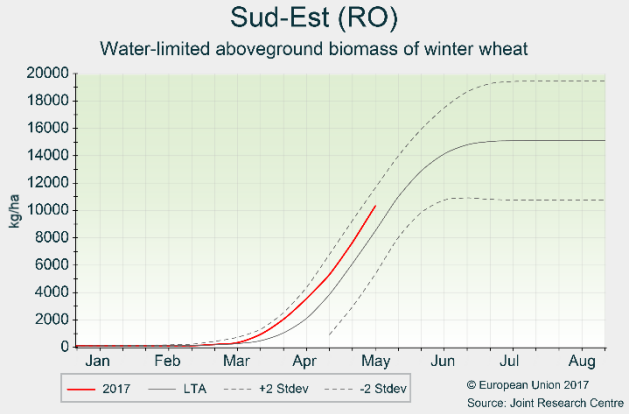
Frost events badly affected flowering rapeseed fields (frost damages, fall of flowers, reduced pollination) in several places, and the weight of the heavy snow may have caused further damage, even though this crop is very resilient. The frosts may also have damaged emerged summer crops, depending on local conditions.

Winter cereals present moderately advanced phenological development. Soil moisture levels are sufficient to meet crop water requirements. Simulated leaf area and biomass accumulation exceed the average in southern and eastern areas but remain near average in the *Centru* and *Nord-Vest* regions. The sowing campaign of summer crops was hampered due to the cold spell and excessive rain in April. On balance, the yield outlook for winter cereals is positive, whereas rapeseed yield is expected to be below the trend.









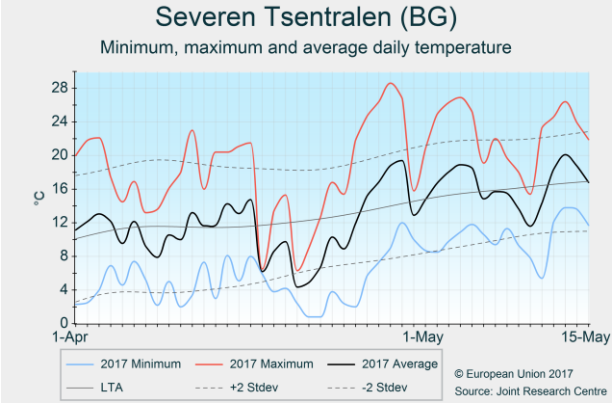
Bulgaria

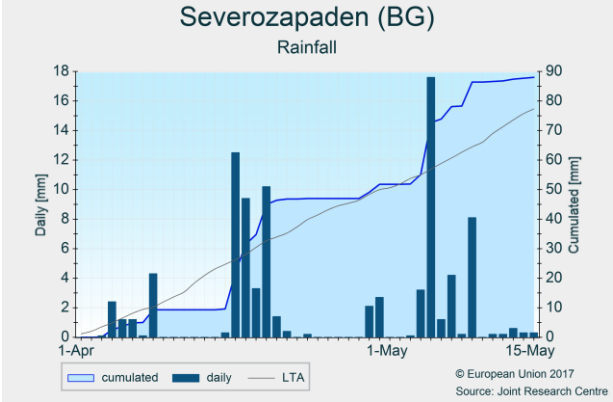
Moderately positive yield outlook

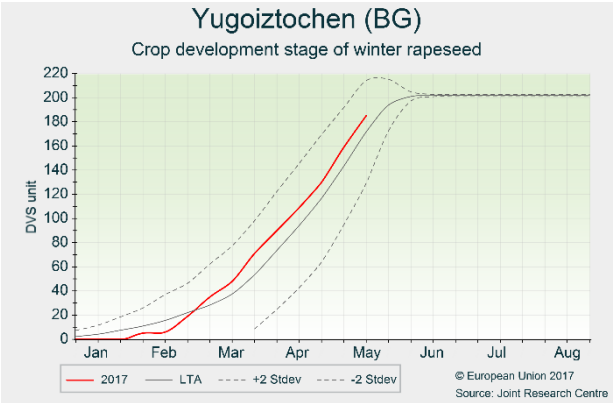
Abundant rainfall favourably increased the soil moisture content. Crop model simulations and remote sensing indicators point to a near- or slightly above-average condition of winter cereals, indicating a fairly positive yield outlook.

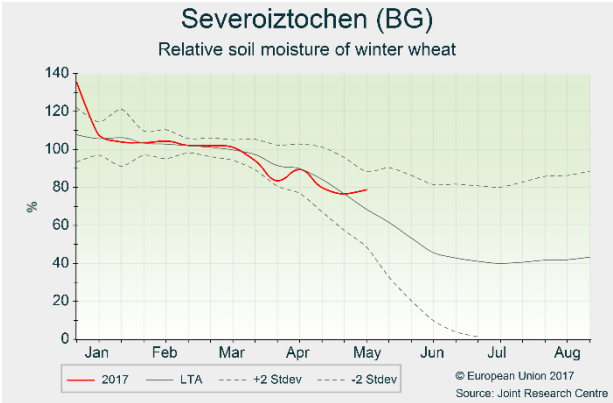
In the first half of April, daily temperatures fluctuated around average. An unusually cold period was experienced between 17 and 24 April, during which daily temperatures remained 3-6°C below the long-term average. Warmer-than-usual weather returned in late April, and has been predominant ever since. While there had been practically no precipitation between mid-March and mid-April, the precipitation tendency increased considerably after 15 April, partially compensating for the dry spell. Considering the review period as a whole (1 April – 15 May), 60-110 mm of rain was recorded, which exceeds the average by 10-40%. Drier periods in between the significant precipitation events allowed for the timely sowing of summer crops. The moisture conditions of seedbeds were adequate, but the sprouting and emergence were somewhat delayed due to the cold weather. The soil moisture levels under winter crops are generally average, except for some drier areas close to the southern border.

The development of rapeseed, winter barley and soft wheat is near average or slightly advanced. Winter wheat is finishing the flowering stage and starting the grain-filling period. Rapeseed presents a more advanced status of the grain-filling phenological phase. Crop models and remote sensing indicators show above-average leaf area expansion and biomass accumulation of winter crops. Thanks to this and the adequate water supply during the early yield formation phase, the outlook is favourable. Our yield forecast is slightly above the trend.









Austria, the Czech Republic and Slovakia

Cold waves affect winter rapeseed and early sown summer crops

Warmer-than-seasonal weather during the first half of April was followed by a period with two marked cold spells, at the end of April and in the first dekad of May. The influence of cold weather on crops was highly variable, but mainly affected winter rapeseed and emerged summer crops. The summer crops sowing campaign, which was interrupted at the end of April, has now mainly finished.

The unusually warm weather during the first half of April accelerated the development of winter crops and led to the early sowing of summer crops in many regions. The warm weather anomaly was interrupted by an abrupt temperature drop during the last days of the second dekad of April. The cold wave that persisted until the first days of May resulted in minimum air temperatures of between -5°C and 0°C for four to six days in major agricultural areas. Local micro-climatic conditions could also have led to much lower temperatures. Crop growth slowed down during the cold period, offsetting the hitherto advanced development due to the preceding warm weather anomaly. Regarding winter crops, frost mainly impacted winter rapeseed, part of which had already entered the flowering stage. Temperatures returned to normal levels at the beginning of May; however, another cold spell at the end of first dekad of May resulted in negative minimum temperatures in the Czech Republic and Slovakia, which may have affected already emerged summer crops (especially potatoes).

Rainfall exceeded the long-term average in central and south-western parts of the Czech Republic, central Slovakia and western Austria. Frequent rainfall and cold weather delayed the sowing of summer crops during the second half of April and the beginning of May. Mild drought conditions, currently with no or limited impact on crop growth, prevail in *Jihovychod*, *Bratislavsky Kray* and locally in eastern Austria.

Soft wheat is approaching the sensitive stage of flowering. Final yields will greatly depend on the weather conditions during this period. Based on the observed weather conditions so far, the yield outlook remains close to the five-year average.

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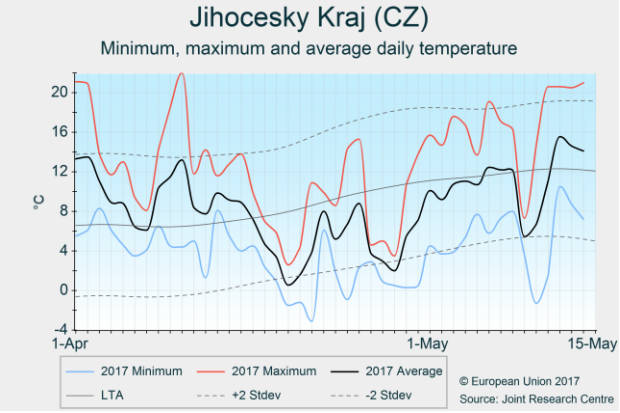
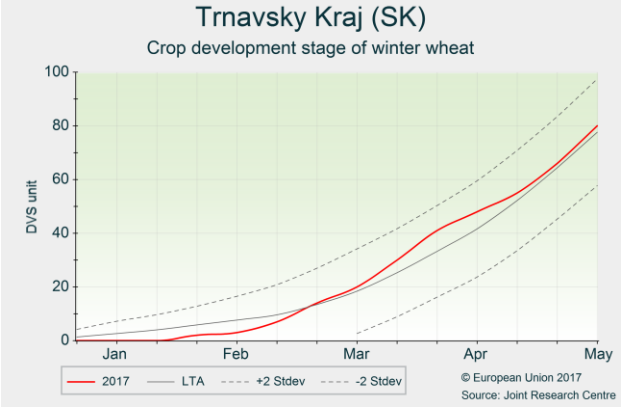




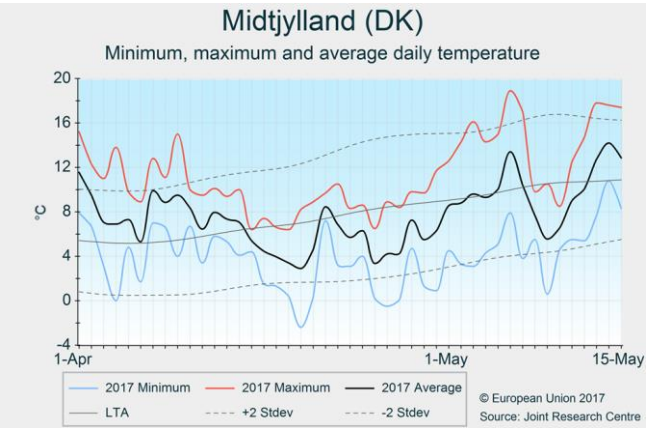
Denmark and Sweden

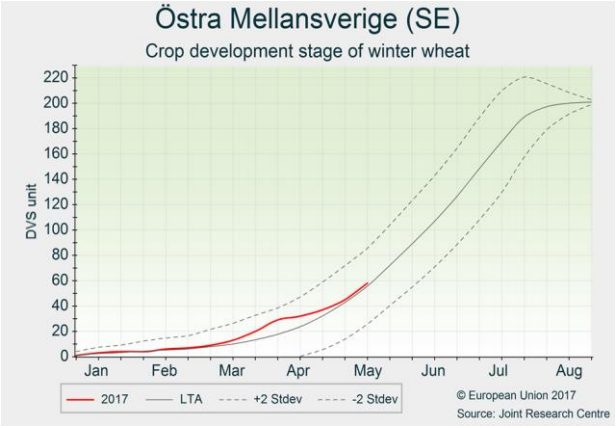
Crop development back to usual

Temperatures dropped drastically after mid-April. Rainfall is lower than usual in eastern Sweden, and at normal ranges elsewhere. Spring cereal sowing, often delayed, is now finished. Crop development in Sweden is delayed in many areas. Slight frost damages on winter cereals expected in eastern Sweden.

After a warm start in April, temperatures dropped remarkably after mid-April and remained below average during most of the remaining part of the review period. A

marked cold-spell was observed around 8-10th May. Frost conditions were more frequent than usual in east and north Sweden. Due to the low temperatures, crop development, which was advanced by mid-April, slowed down and is currently around average, or, as in the case of North Sweden, below the long term average. Rainfall was around average in Denmark, and in the west and south Sweden, but below average in the remaining parts of Sweden. A higher than elsewhere, though not critical rainfall deficit is observed for *Stockholms Län, Östra Mellansverige* and *Norra Mellansverige*. Sowing of spring cereals is finished in both countries, after long-lasting field works. General crop development, as inferred from remote sensing observations, is especially delayed in northern Sweden. In particular spring cereal development in Sweden is delayed by 10 days to two weeks (south), as well as winter cereal development in *Norra Sverige*. Delays are due to both difficult sowing conditions and to slow crop development. Crop development in west Sweden appears to be in time. Rapeseed is delayed in *Småland Med Öarna (SE),* and sugar beet in both countries. Winter cereals and spring barley might be slightly affected by frost conditions in east Sweden.



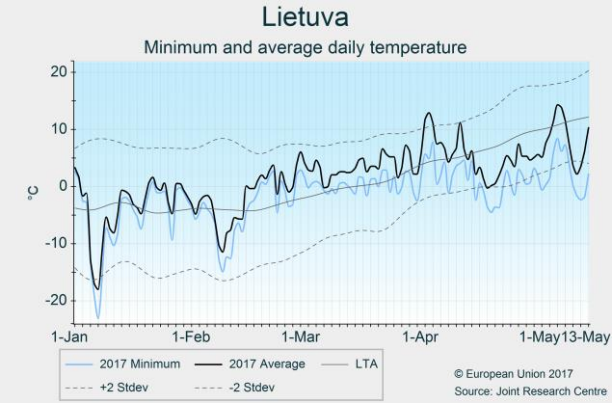


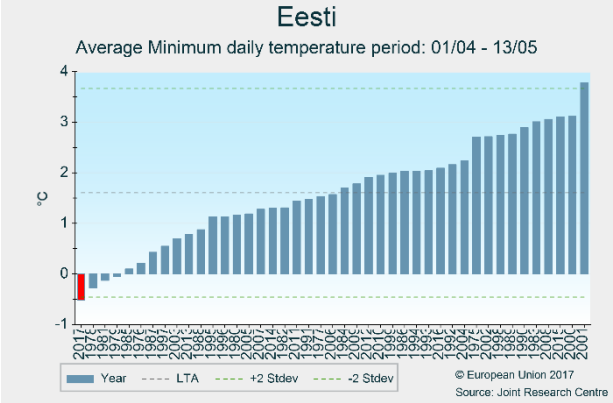
Finland, Lithuania, Latvia and Estonia

Cold spell delays crop growth and spring sowing activities

A cold spell slowed the development of winter crops, the outlook for which is now average in Lithuania and Latvia. Spring sowing activities have been completed in these two countries, while in Estonia and Finland they are still ongoing with a delay of around two weeks.

The unusually warm weather during the first half of April was followed by an abrupt temperature drop. The cold spell, which lasted until a few days before the end of the review period, brought wind, rain and snowfall to the whole region, with different degrees of severity. In Lithuania and Latvia, the countries with the highest share of winter crops (around 70%), low temperatures (Tmin > -4°C) slowed crop growth. Crop development, which had been advanced, returned to average levels. Local news confirms a relatively good status of winter crops, but the continued lack of radiation and of warm temperatures could constrain yield potential, as crops will reach the flowering phase in the coming weeks (rapeseed in the coming days). Spring-sowing activities are practically finished in these countries, and warm temperatures are needed for the good establishment of crops. In Finland and Estonia, temperatures dropped to critical values (Tmin <-7°C), and frost-kill losses are likely to have occurred. However, on a country scale the impact is not very significant because the share of winter crops is low. Possible losses can be re-planted during the spring sowing campaign, which is currently ongoing as the freezing weather delayed sowing activities by around two weeks. However, sowing activities progressed rapidly during the last few days of the review period, when temperatures started to increase. The yield forecasts for winter crops remain close to or slightly above the five-year average. The forecasts for spring crops are still based on the five-year average or historical trends.





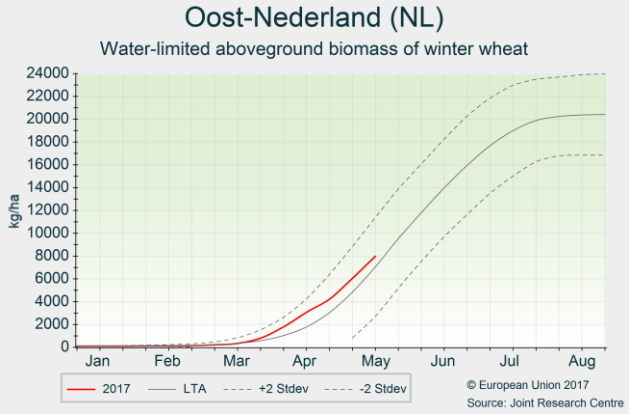
Belgium, the Netherlands and Luxembourg

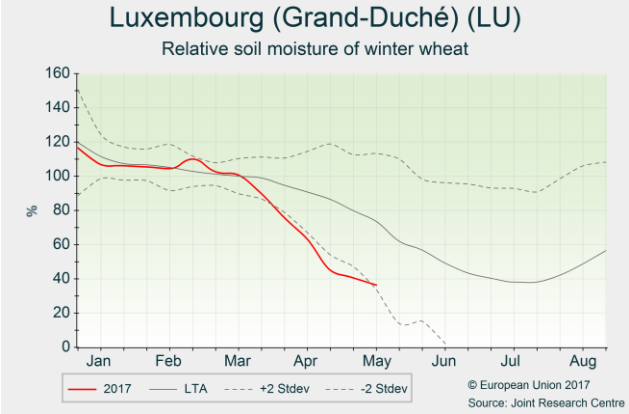
Crops affected by water stress in southern areas

Continued drier-than-usual conditions started to affect the growth of winter crops in southern parts of the Netherlands, Belgium and Luxembourg. The yield forecast for winter crops was revised downwards for Belgium and (most markedly) Luxembourg. Spring crops got off to a slow start due to dry and/or colder-than-usual conditions.

Rainfall was below average in all parts of the Benelux countries. The deficit gradually decreased northwards, from more than 60 mm in Luxembourg and southern Belgium, to less than 25 mm in northern parts of the Netherlands, as compared to the long-term average for the review period. The first half of April was significantly warmer than usual. Colder-than-usual conditions prevailed since then, until a few days before the end of the review period. Temperatures of below 0°C (in several cases reaching -5°C) were common between 18 April and 1 May, and again around 9 May. The growth of winter crops has been negatively affected by water stress in the southern areas, which received little rainfall since mid-March. Phenological development is already advanced in these areas, and it seems unlikely that crops will be able to fully recover and produce high yields. However, winter crops are generally faring well in northern Belgium and most of the Netherlands, and present a good yield outlook. Frost damage caused by the cold spell appears to have been very limited. On balance, this has led to a slight downward revision of the yield forecast for winter crops in Belgium and, more markedly, for Luxembourg. For the Netherlands, the yield forecast was revised slightly upwards.

Spring crops got off to a slow start. Sugarbeet sowing was practically finished by mid-April, but emergence and early crop establishment was very slow due to cold and/or dry conditions. Potato sowing activities and emergence were delayed for the same reasons. Frost damage appears to have been limited. With the return of favourable temperatures, and soil moisture conditions allowing, these crops are likely to present accelerated development in the coming weeks. As it is still very early in the season, the yield forecasts for these crops are maintained at the historical trend.





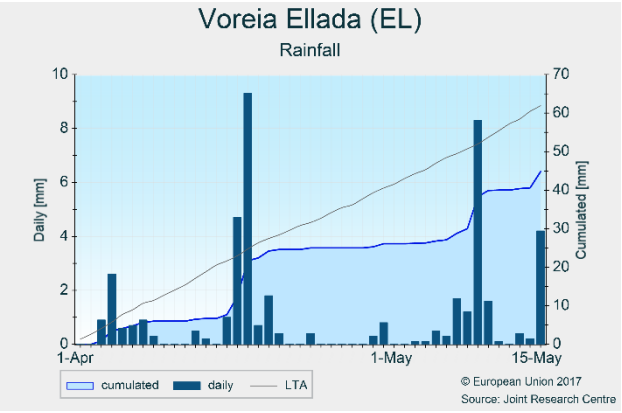
Greece and Cyprus

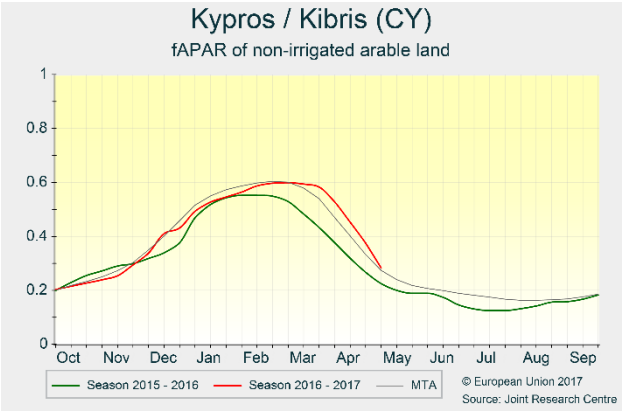
Fair outlook

Winter crop yield forecasts for Greece remain in line with April figures and around the five-year average; barley is the least performing crop. Dry conditions in central Greece are expected to be mitigated by rainfall in the coming days, while optimal conditions are observed in north-eastern regions. In Cyprus, yield expectations are reduced due to a dry end of the season.

In Greece, April temperatures were generally above average. The cold spell that hit Europe in late April was less severe, and turned out to be beneficial as it reduced the crops' evapotranspiration during a dry period. In May, temperatures returned to above-average values, promoting the biomass accumulation of winter crops and accelerating phenological development from delayed to normal stages in *Thessalia* and western *Makedonia*, although this remained slightly delayed in north-eastern regions. Cumulated precipitation remained below average, especially in *Thessalia*, where there was no precipitation for almost one month. However, the dry period partially overlapped with reduced temperatures, and the diminished water demand minimised the negative impact. In addition, some precipitation occurred in May at the beginning of the grain-filling phase, and more is expected in the coming days. Precipitation was more abundant in north-eastern regions, where, despite being delayed and not yet flowering, winter crops are developing under favourable conditions. The recently planted summer crops have emerged, and are in the early stages of vegetative growth.

In Cyprus, crops have almost reached maturity. The end of season was dry, which slightly hampered the grain filling of durum wheat and winter barley. Grain- yield forecasts are still above the five-year average, but down by around 16% compared to our forecasts from April.





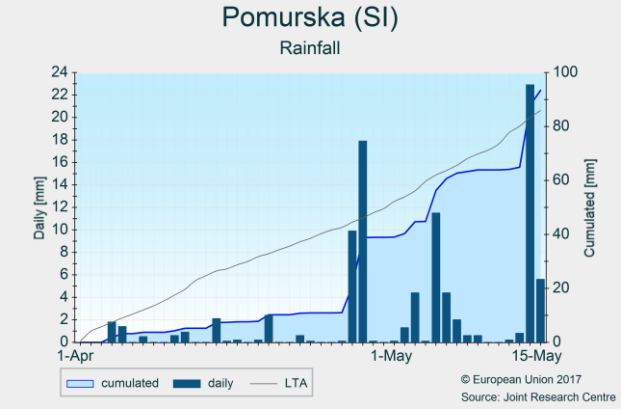
Slovenia and Croatia

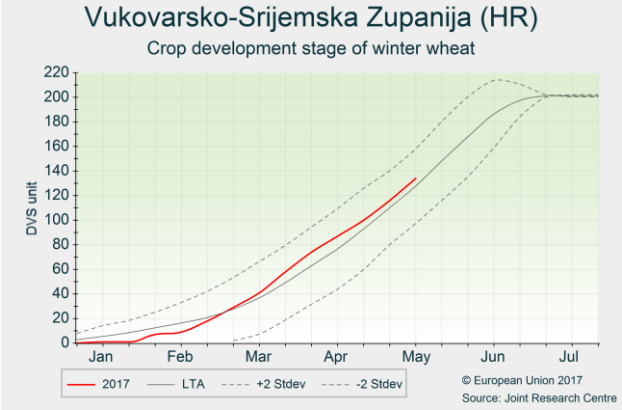
Cold spell at the end of April with localised impact on crops

Exceptionally warm weather during the first half of April was followed by a cold spell at the end of April, which mainly affected winter rapeseed and summer crops that had already emerged in Slovenia. The first half of May was characterised by seasonal temperatures, and the soil moisture deficit in many regions of eastern Slovenia and north-western Croatia was alleviated by rainfall events at the end of April.

An exceptionally warm weather anomaly in the first half of April was interrupted by an inflow of cool air in the second half of April. Minimum air temperatures in major agricultural areas were between -5°C and -2°C in Slovenia, and between -2°C and 0°C in eastern and north-western Croatia. Regarding crops, this cold spell mainly affected winter rapeseed, which was approaching the flowering stage, and potato crops that had already emerged. Air temperatures returned to normal during the first half of May. A warm weather anomaly in March and the first half of April accelerated the development of winter crops; consequently, soft wheat is currently approaching, or has already entered, the sensitive flowering stage.

Rainfall cumulates were close to the long-term average, except in south-western Slovenia, regionally in eastern Slovenia, and in north-western Croatia, where a slight deficit was recorded. Nevertheless, the soil moisture deficit, which affected winter crops in north-eastern Slovenia, north-western and (regionally in) eastern Croatia since the beginning of March, was alleviated by rainfall events at the end of April and in the first half of May. Our model simulations currently indicate good progress of soft wheat and winter barley. Partially replenished soil moisture levels around the flowering stage of soft wheat indicate promising yield conditions. The forecast for winter crops is therefore currently slightly above the five-year average. The growth and development of summer crops were delayed by cold and rainy weather at the end of April, but were compensated by more favourable weather conditions during the first half of May. Similar to last year, summer crops, which have already emerged and were locally affected by cold weather at the end of April, were replanted during the first half of May.





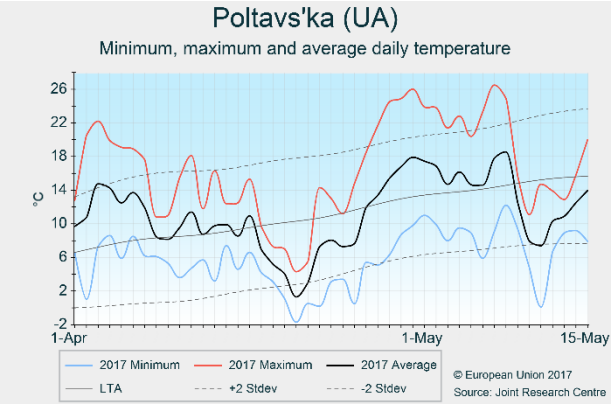
3.2 Black Sea Area

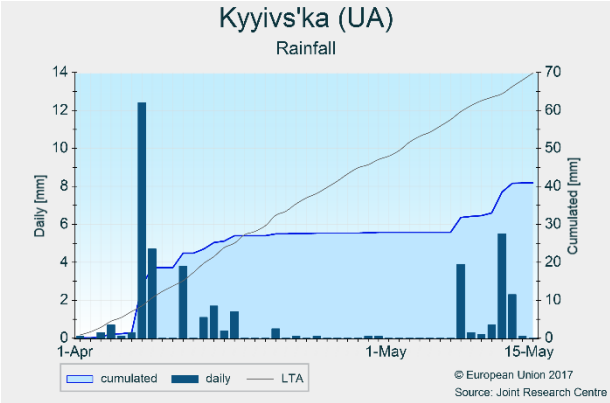
Ukraine

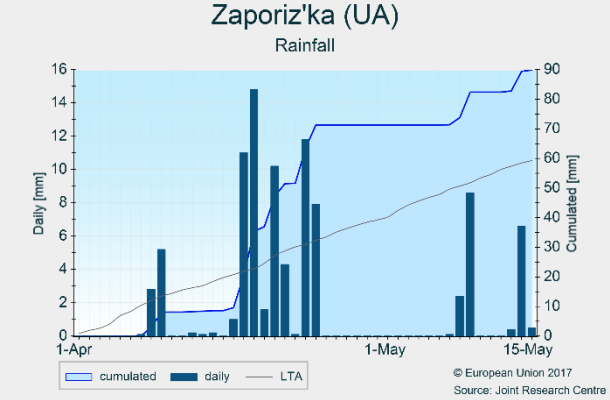
Positive outlook for winter cereals

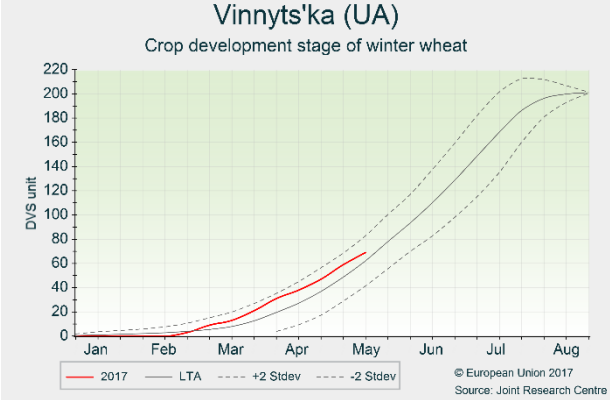
Winter crops and spring barley are benefiting from good conditions. The few adverse events recorded since the beginning of April (cold spell, heavy rain) had no major impact on the yield outlook, which is expected to follow the positive trend related to technological improvements.

Temperature amplitude varied greatly since the beginning of April. A cold spell with temperatures reaching -4°C in the northernmost oblasts was recorded during the last dekad of April, and a second one was recorded during the second dekad of May, with minimum temperatures reaching -2°C in central Ukraine. As winter crops were still in the vegetative stage during the cold spells, no frost-kill damage was incurred. Temperatures were warmer than average between these cold spells, particularly during the first dekad of May, when maximum temperature reached 26°C. Winter crops and spring barley therefore maintained their advance compared to an average year, despite their growth being interrupted by cold temperatures for a few days. Since the beginning of April, rainfall has been highly heterogeneous. A prolonged rain deficit is still ongoing in northern and central Ukraine, while southern and eastern Ukraine received more rain than average, due to heavy rainfall in mid-April. The rain deficit is concentrated in the main maize-producing regions; the main barley- and wheat-producing regions were spared from the dry conditions. Grain maize is not impacted at this stage, but some rain will be needed in the coming weeks to ensure a good start to the season. The rainfall surplus recorded in eastern Ukraine in mid-April partially delayed sowing activities of sunflowers, grain maize and soybeans, but this does not affect the yield outlook for summer crops







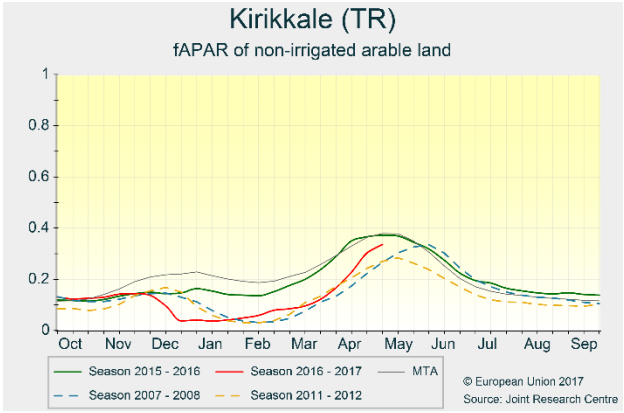


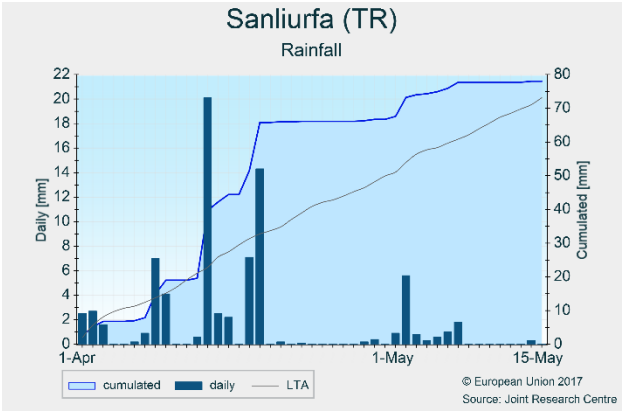
Turkey

Improved conditions for winter cereals

The leaf area expansion of winter crops is proceeding at an average rate, but phenological development and green biomass accumulation remain delayed in Anatolian regions. Yield forecasts for both barley and wheat are above the five-year average, and have increased compared to April's forecasts thanks to the improved weather conditions in central and western regions. The outlook in eastern regions remains positive despite a dry May.

In April, large parts of the country experienced cold spells and night frosts that lasted few days at the beginning and the end of April. However, as wheat and barley were not yet flowering, no frost-kill damage was incurred in central and western Anatolia. From the beginning of May, temperatures significantly increased and boosted biomass accumulation and phenological development. In *Konya* and *Kayseri,* precipitation around mid-April and in May fully supported plant growth. In the northern Anatolian region (e.g. *Ankara*), rain was just sufficient, and more is needed now that winter crops are approaching the flowering stage. In western Turkish regions (from *Sakarya* to *Ayidin*), where about 25% of maize is cultivated, sufficient and well-distributed precipitation in April sustained the emergence and initial development of maize. In those regions, water reservoirs for irrigation have been replenished. In south-eastern Turkish regions of *Mardin* and *Sanliurfa* winter crops recovered from delayed stages in late March, thus the low temperature of late April may have slowed down the pollination process, but probably without any relevant impact on grain yield. In mid-May, maximum temperatures rose above 30°C, and precipitation diminished just at the beginning of the grain-filling stage.





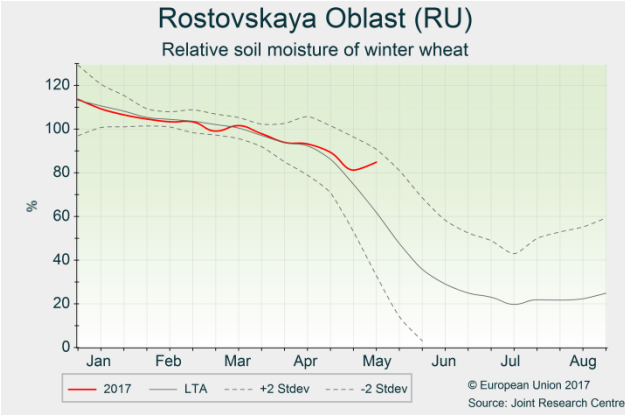
3.3 European Russia and Belarus

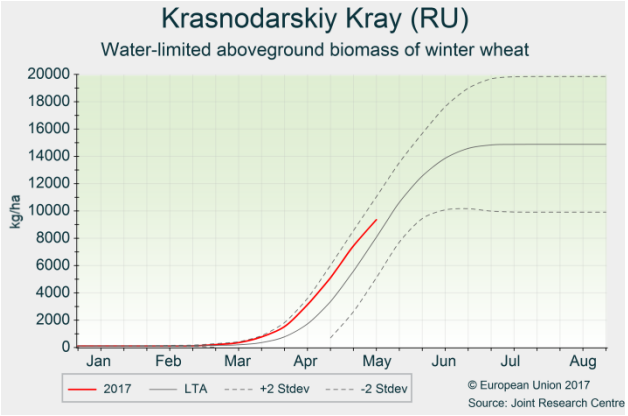
European Russia

Spring sowing campaign delayed due to cold and wet weather

Severe frosts in the last dekad of April affected the central and southern regions of Russia. The southern half of the country received significantly more precipitation than usual. These rains were beneficial for winter cereals, but delayed the sowing of spring crops. Winter wheat yield expectations are slightly above average.

After a mild March, daily temperatures fluctuated around the average in the first half of April, but the south-eastern part of the Near Volga Okrug was moderately colder than usual. Around 20 April, an arctic cold-air intrusion accompanied by snowfall reached the Central and Near Volga Okrugs, resulting in severe frost events. Minimum temperatures fell to -6°C to -8°C. Frost damage may have occurred locally in de-hardened winter wheat stands, primarily in the Chernozem Belt. Temperatures became noticeably warmer at the end of April and in early May, but the below-seasonal temperatures returned in the second dekad of May. Since 1 April, precipitation has been above average (50-100 mm) in most of Russia, but the western parts of the Chernozem Belt, the southern Near Volga Okrug and some eastern parts of the Southern Okrug received less than 40 mm rainfall. The wet and cold weather conditions that prevailed after mid-April slowed the progress of the spring sowing campaign. Winter crop development is mostly slightly advanced in the main producing south-western regions, but is somewhat delayed towards the north and east. According to our model simulations, winter wheat has started flowering close to the Black Sea - north of the Caucasus. Soil moisture levels are mostly average or above. Crop model simulation and analysis of remote-sensing images indicate near- or above-average biomass accumulation and canopy expansion in most of south-western Russia. Areas along the Caucasus Mountains (e.g. *Stavropolskiy Krays*), several spots of the *Rostovskaya Oblast and* the western regions of the Chernozem Belt present lower-than-usual biomass because of delayed development and growth problems due to difficult wintering conditions.





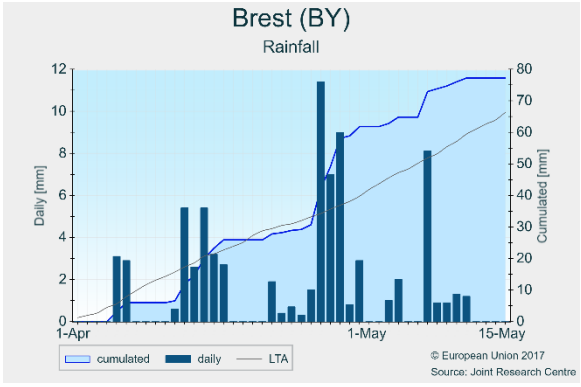
Belarus

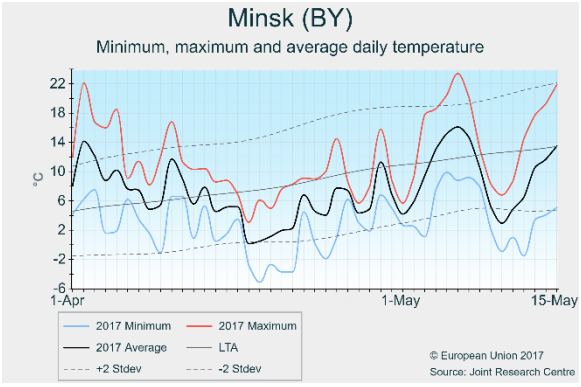
Winter cereal development slowed down by cold temperatures

Winter cereal development was slowed down by cold temperatures and precipitation, which are also delaying the sowing of summer crops. The forecast is in line with the trend, as these conditions are not yet critical for plant development.

The cold temperature conditions recorded from the end of April to the first dekad of May, with temperatures falling below zero throughout the country, and continuous precipitation (4 to 7 more days with daily rainfall greater than 5 mm compared to the LTA), are not creating critical problems for winter crops. Plants were at the development stage of early booting, and damages to leaves were only sporadically reported. Our forecasts for winter cereals have therefore been maintained on the trend. The situation will be followed closely because the recent temperature increase and the high water availability due to abundant precipitation could create very favourable conditions for crop development, but this could also be highly conducive to the development and spread of crop disease.

The summer crop sowing campaign is delayed due to the unfavourable thermal conditions and high soil moisture levels.





3.4 Maghreb

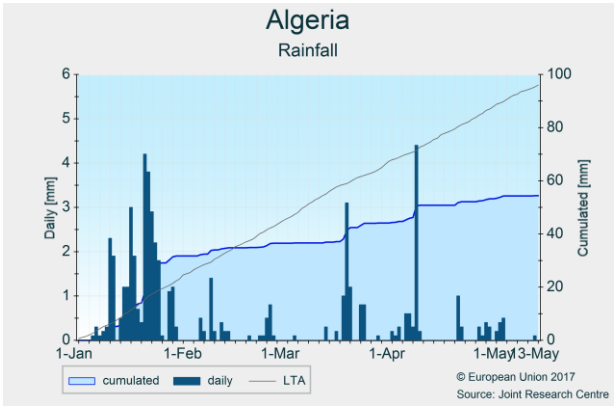
Morocco, Algeria, Tunisia

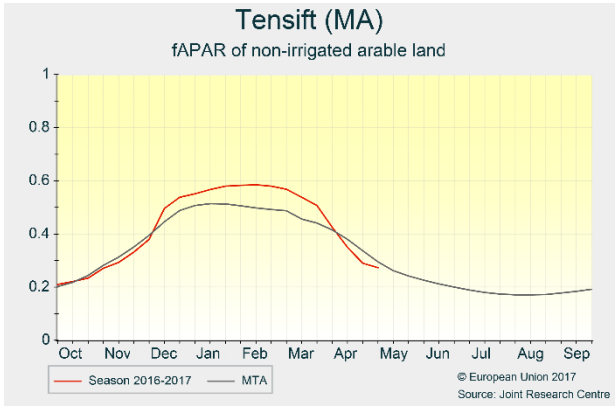
Poor season in Algeria; positive in Morocco and Tunisia

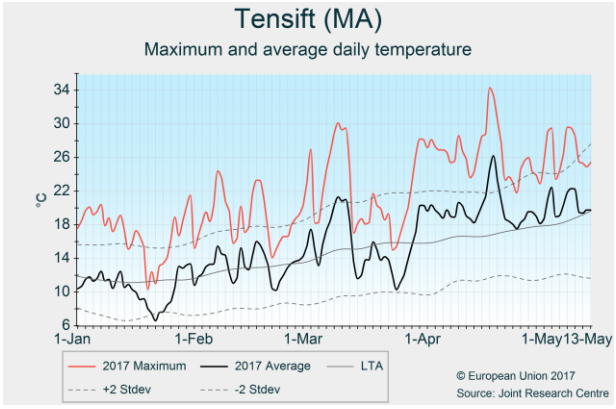
Morocco, Algeria and Tunisia have all experienced unusually hot and dry conditions since the beginning of April. Forecasts are still above average for all crops in Morocco and Tunisia, albeit with a tempered yield outlook for barley in Morocco. The yield outlook for Algeria was revised downwards, and remains below average.

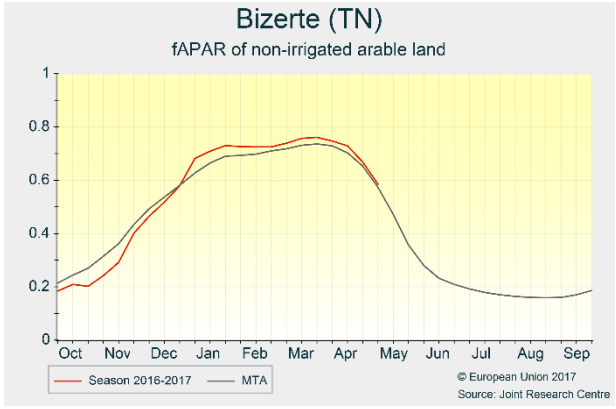
This spring has been exceptionally warm and dry in practically the entire Maghreb. The highest temperatures in April were registered in Morocco (Tmax>33°C in *Tensift*). These unusually dry and hot conditions coincided with the grain-filling of winter cereals, and the remote sensing indicator (fAPAR) shows a slightly shortfall in this process and accelerated senescence in the *Nord Ouest* and *Centre*. In *Tensif*, where the Moroccan barley production is mainly concentrated, signals of growth stress (a more marked drop in the fAPAR indicator) are most evident. The yield forecasts were therefore revised downwards, but they are still above average (also for durum wheat and soft wheat). The main agricultural regions of Tunisia don't show any signal of constraint on yields as crops are reaching maturity. In this country, a wet winter, rainy mid-April and maximum temperatures of less than 30°C during the formation of grains helped to sustain crop development; consequently, our forecasts remain above average. By contrast, the yield expectation in Algeria remains below average for all crops. In this country, the persistent lack of precipitation and the high temperatures during grain formation

limited yield potential in central and some western regions, whereas eastern and western regions (i.e. *Tiaret*, *Saida*) were already impacted by persistent drought stress at the beginning of the flowering phase.



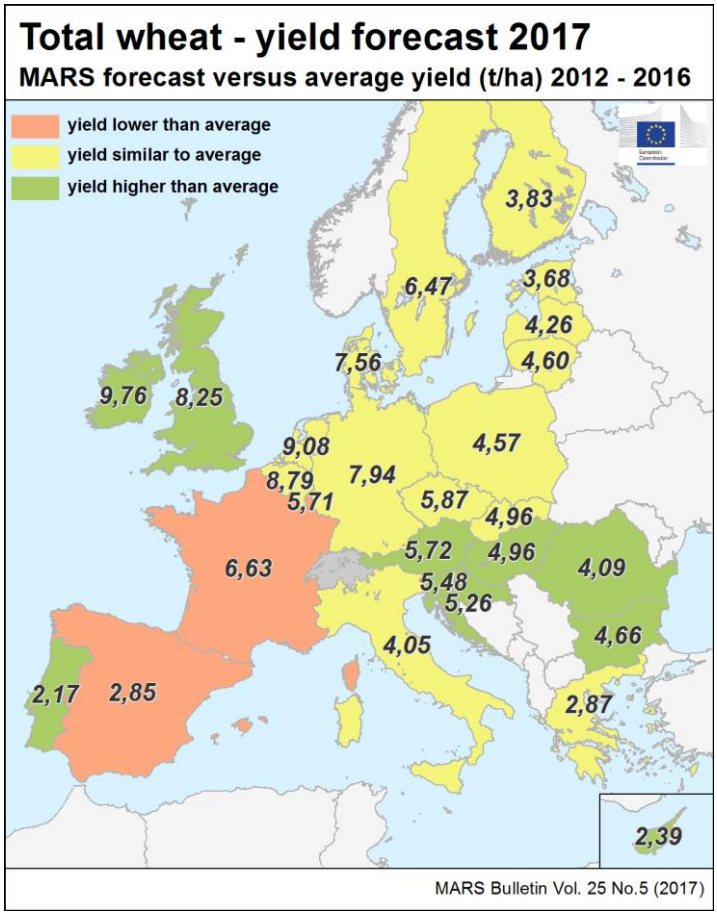




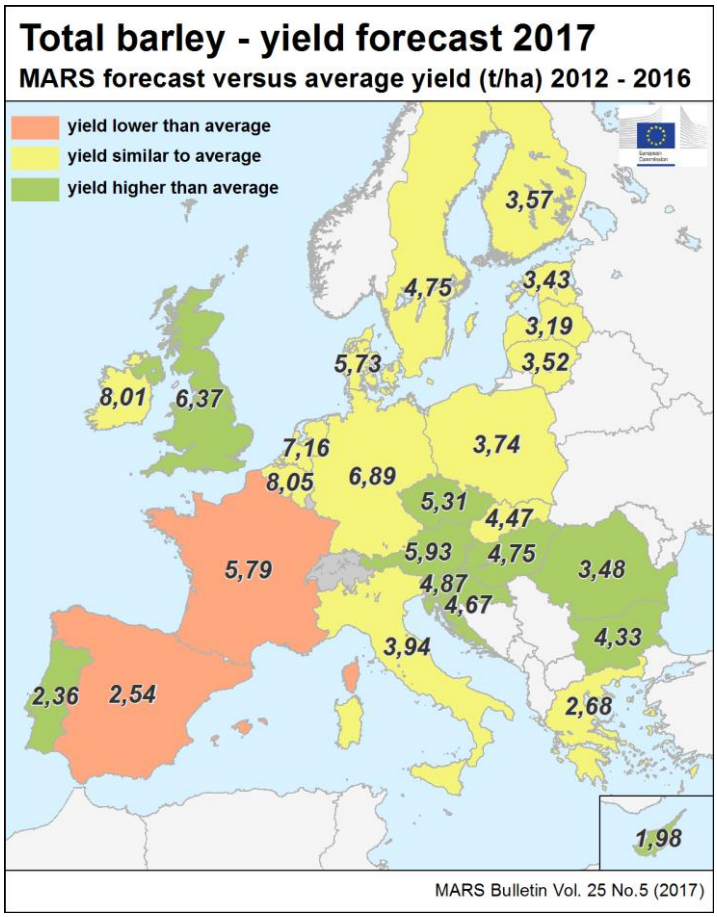


4. Crop yield forecasts

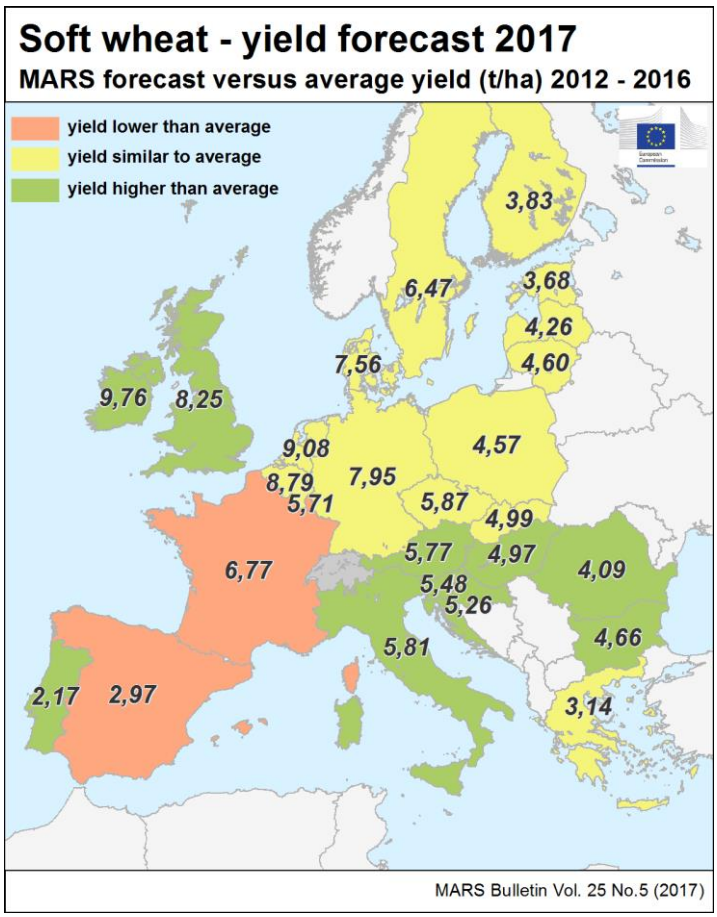
Country	TOTAL WHEAT (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	5.60	5.35	**5.66**	+1.0	+5.8
AT	5.48	6.22	**5.72**	+4.5	-8.0
BE	8.52	6.65	**8.79**	+3.2	+32
BG	4.28	4.75	**4.66**	+8.7	-1.9
CY	2.16	1.69	**2.39**	+11	+42
CZ	5.88	6.50	**5.87**	-0.2	-9.7
DE	7.95	7.65	**7.94**	-0.1	+3.8
DK	7.54	7.19	**7.56**	+0.3	+5.1
EE	3.77	2.77	**3.68**	-2.4	+33
ES	3.07	3.53	**2.85**	-7.1	-19
FI	3.84	3.77	**3.83**	-0.3	+1.7
FR	6.94	5.30	**6.63**	-4.5	+25
GR	2.83	2.35	**2.87**	+1.5	+22
HR	5.01	5.50	**5.26**	+5.0	-4.2
HU	4.72	5.38	**4.96**	+5.1	-7.7
IE	9.11	9.54	**9.76**	+7.1	+2.3
IT	3.96	4.20	**4.05**	+2.2	-3.6
LT	4.66	4.36	**4.60**	-1.3	+5.4
LU	5.95	5.07	**5.71**	-4.1	+12
LV	4.20	4.30	**4.26**	+1.4	-1.0
MT	-	-	**-**	-	-
NL	8.89	8.01	**9.08**	+2.1	+13
PL	4.52	4.54	**4.57**	+1.0	+0.7
PT	1.82	2.31	**2.17**	+19	-6.4
RO	3.50	3.93	**4.09**	+17	+3.9
SE	6.53	6.32	**6.47**	-1.0	+2.3
SI	5.08	5.19	**5.48**	+7.9	+5.6
SK	4.95	5.93	**4.96**	+0.3	-16
UK	7.87	7.89	**8.25**	+4.8	+4.6



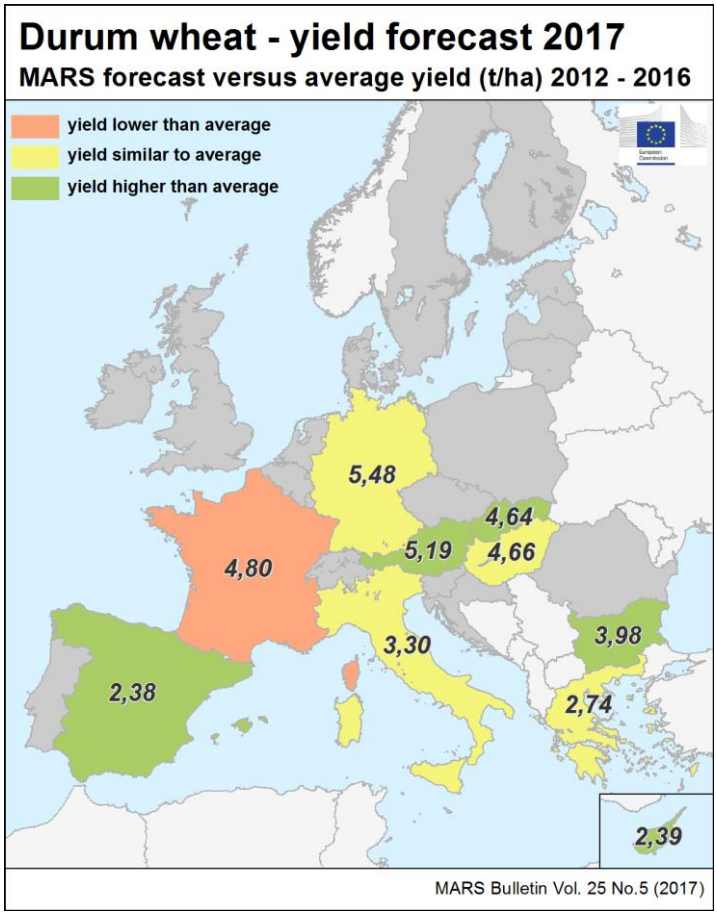
Country	TOTAL BARLEY (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	4.83	4.87	**4.76**	-1.5	-2.2
AT	5.39	6.12	**5.93**	+10	-3.2
BE	8.18	6.21	**8.05**	-1.7	+30
BG	3.90	4.32	**4.33**	+11	+0.0
CY	1.72	0.70	**1.98**	+15	+183
CZ	5.08	5.66	**5.31**	+4.5	-6.2
DE	6.79	6.69	**6.89**	+1.5	+2.9
DK	5.78	5.61	**5.73**	-0.9	+2.1
EE	3.39	2.64	**3.43**	+1.1	+30
ES	2.91	3.62	**2.54**	-13	-30
FI	3.57	3.59	**3.57**	-0.1	-0.5
FR	6.45	5.41	**5.79**	-10	+7.1
GR	2.79	2.31	**2.68**	-3.9	+16
HR	4.46	4.72	**4.67**	+4.5	-1.1
HU	4.43	5.14	**4.75**	+7.2	-7.7
IE	7.71	7.82	**8.01**	+3.8	+2.4
IT	3.81	4.13	**3.94**	+3.3	-4.8
LT	3.55	3.13	**3.52**	-0.7	+12
LU	-	-	**-**	-	-
LV	3.22	2.96	**3.19**	-1.0	+7.8
MT	-	-	**-**	-	-
NL	7.02	6.82	**7.16**	+2.1	+5.1
PL	3.72	3.75	**3.74**	+0.7	-0.1
PT	2.04	2.62	**2.36**	+16	-9.9
RO	3.23	3.80	**3.48**	+7.8	-8.4
SE	4.89	4.80	**4.75**	-2.7	-1.0
SI	4.61	4.78	**4.87**	+5.6	+1.8
SK	4.34	5.29	**4.47**	+2.9	-16
UK	6.10	5.93	**6.37**	+4.4	+7.4



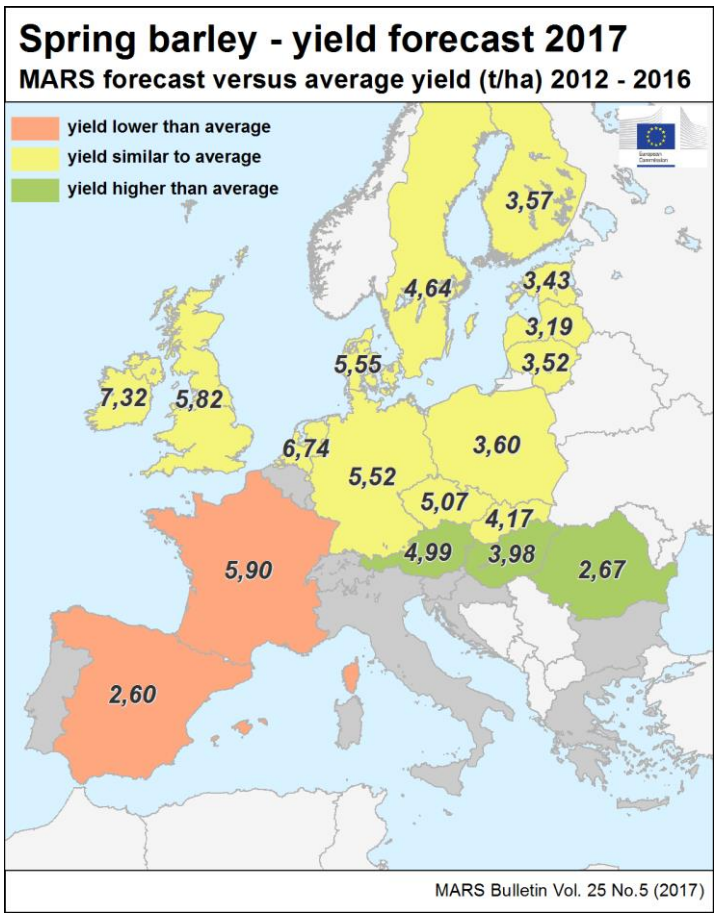
Country	SOFT WHEAT (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	5.84	5.56	**5.91**	+1.2	+6.2
AT	5.52	6.29	**5.77**	+4.4	-8.4
BE	8.52	6.65	**8.79**	+3.2	+32
BG	4.29	4.75	**4.66**	+8.6	-1.9
CY	-	-	**-**	-	-
CZ	5.88	6.50	**5.87**	-0.2	-9.7
DE	7.96	7.67	**7.95**	-0.1	+3.7
DK	7.54	7.19	**7.56**	+0.3	+5.1
EE	3.77	2.77	**3.68**	-2.4	+33
ES	3.25	3.84	**2.97**	-8.8	-23
FI	3.84	3.77	**3.83**	-0.3	+1.7
FR	7.07	5.38	**6.77**	-4.3	+26
GR	3.10	2.33	**3.14**	+1.2	+35
HR	5.01	5.50	**5.26**	+5.0	-4.2
HU	4.72	5.39	**4.97**	+5.2	-7.8
IE	9.11	9.54	**9.76**	+7.1	+2.3
IT	5.51	5.65	**5.81**	+5.4	+2.8
LT	4.66	4.36	**4.60**	-1.3	+5.4
LU	5.95	5.07	**5.71**	-4.1	+12
LV	4.20	4.30	**4.26**	+1.4	-1.0
MT	-	-	**-**	-	-
NL	8.89	8.01	**9.08**	+2.1	+13
PL	4.52	4.54	**4.57**	+1.0	+0.7
PT	1.82	2.31	**2.17**	+19	-6.4
RO	3.50	3.93	**4.09**	+17	+3.9
SE	6.53	6.32	**6.47**	-1.0	+2.3
SI	5.08	5.19	**5.48**	+7.9	+5.6
SK	4.98	6.10	**4.99**	+0.1	-18
UK	7.87	7.89	**8.25**	+4.8	+4.6



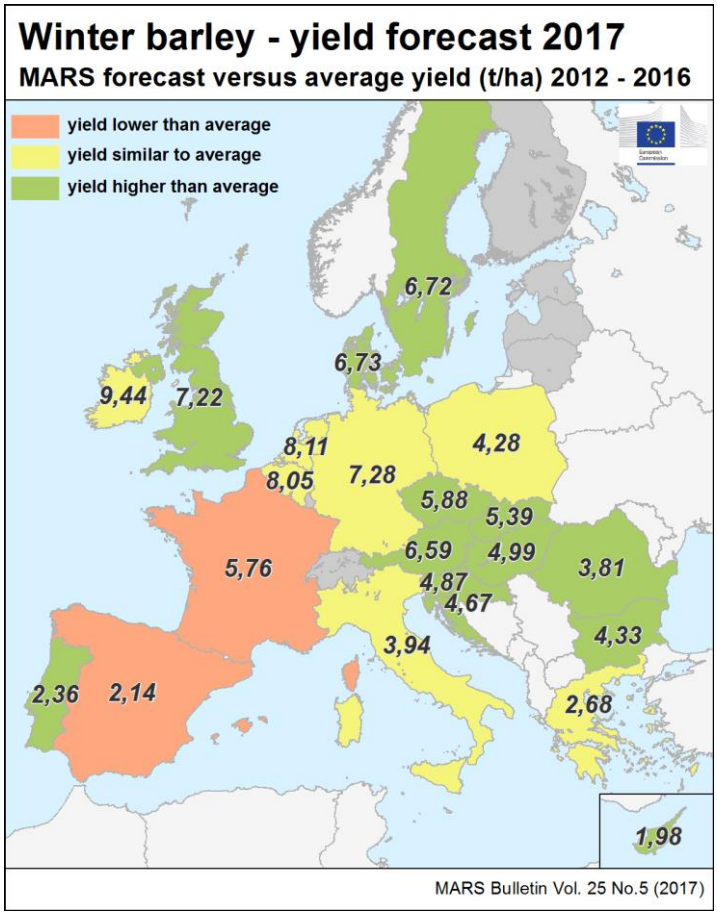
Country	DURUM WHEAT (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	3.32	3.40	**3.34**	+0.6	-1.6
AT	4.65	5.33	**5.19**	+12	-2.6
BE	-	-	**-**	-	-
BG	3.28	4.03	**3.98**	+21	-1.2
CY	2.16	1.69	**2.39**	+11	+42
CZ	-	-	**-**	-	-
DE	5.36	5.31	**5.48**	+2.3	+3.3
DK	-	-	**-**	-	-
EE	-	-	**-**	-	-
ES	2.16	2.29	**2.38**	+10	+3.9
FI	-	-	**-**	-	-
FR	5.13	4.24	**4.80**	-6.5	+13
GR	2.70	2.36	**2.74**	+1.6	+16
HR	-	-	**-**	-	-
HU	4.64	4.97	**4.66**	+0.5	-6.2
IE	-	-	**-**	-	-
IT	3.28	3.65	**3.30**	+0.6	-9.6
LT	-	-	**-**	-	-
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	-	-	**-**	-	-
PL	-	-	**-**	-	-
PT	-	-	**-**	-	-
RO	-	-	**-**	-	-
SE	-	-	**-**	-	-
SI	-	-	**-**	-	-
SK	4.28	4.37	**4.64**	+8.3	+6.2
UK	-	-	**-**	-	-



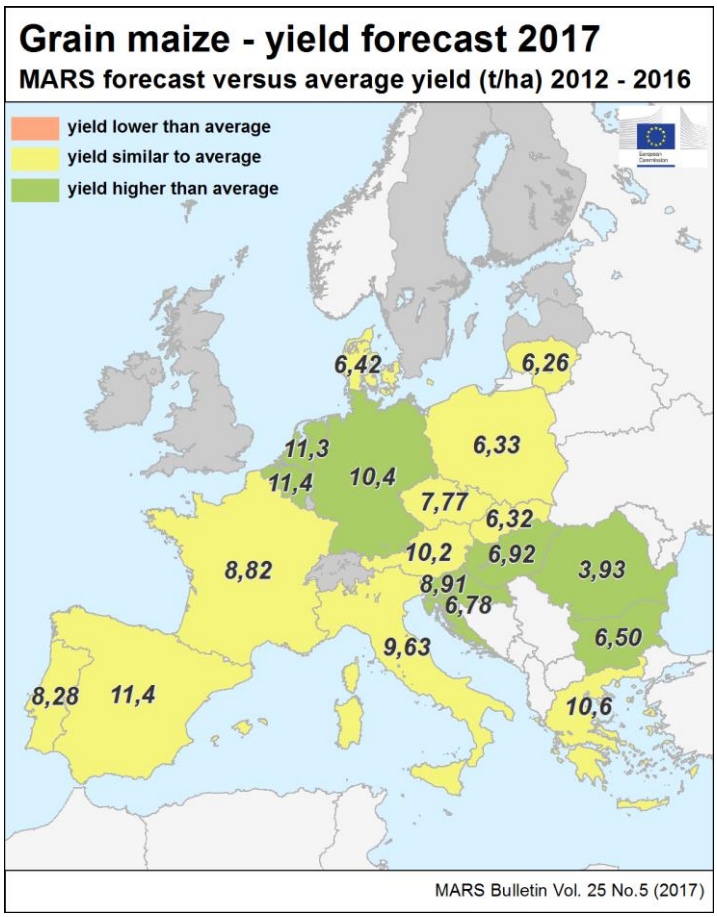
Country	SPRING BARLEY (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	4.23	4.34	**4.06**	-3.8	-6.5
AT	4.49	5.31	**4.99**	+11	-6.1
BE	-	-	-	-	-
BG	-	-	-	-	-
CY	-	-	-	-	-
CZ	5.05	5.45	**5.07**	+0.5	-6.9
DE	5.55	5.26	**5.52**	-0.6	+4.9
DK	5.65	5.51	**5.55**	-1.8	+0.6
EE	3.39	2.64	**3.43**	+1.1	+30
ES	3.00	3.74	**2.60**	-13	-31
FI	3.57	3.59	**3.57**	-0.1	-0.5
FR	6.16	5.00	**5.90**	-4.2	+18
GR	-	-	-	-	-
HR	-	-	-	-	-
HU	3.55	4.18	**3.98**	+12	-4.7
IE	7.17	7.29	**7.32**	+2.2	+0.4
IT	-	-	-	-	-
LT	3.55	3.13	**3.52**	-0.7	+12
LU	-	-	-	-	-
LV	3.22	2.96	**3.19**	-1.0	+7.8
MT	-	-	-	-	-
NL	6.77	6.53	**6.74**	-0.5	+3.2
PL	3.59	3.62	**3.60**	+0.2	-0.7
PT	-	-	-	-	-
RO	2.44	2.80	**2.67**	+9.6	-4.5
SE	4.83	4.74	**4.64**	-3.9	-2.1
SI	-	-	-	-	-
SK	4.21	5.03	**4.17**	-1.0	-17
UK	5.66	5.61	**5.82**	+2.8	+3.7



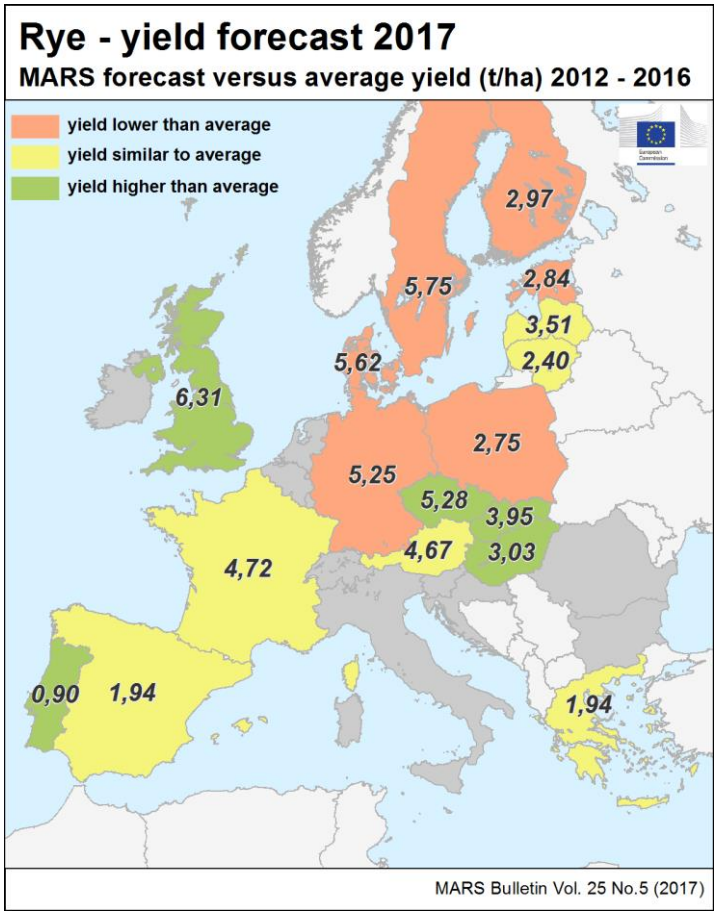
Country	WINTER BARLEY (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	5.68	5.53	**5.69**	+0.1	+2.8
AT	6.08	6.59	**6.59**	+8.4	+0.1
BE	8.18	6.21	**8.05**	-1.7	+30
BG	3.90	4.32	**4.33**	+11	+0.0
CY	1.72	0.70	**1.98**	+15	+183
CZ	5.17	6.13	**5.88**	+14	-4.0
DE	7.20	7.08	**7.28**	+1.1	+2.8
DK	6.45	6.16	**6.73**	+4.2	+9.2
EE	-	-	-	-	-
ES	2.37	2.66	**2.14**	-9.7	-19
FI	-	-	-	-	-
FR	6.56	5.53	**5.76**	-12	+4.2
GR	2.79	2.31	**2.68**	-3.9	+16
HR	4.46	4.72	**4.67**	+4.5	-1.1
HU	4.74	5.31	**4.99**	+5.2	-6.0
IE	9.16	8.64	**9.44**	+3.1	+9.4
IT	3.81	4.13	**3.94**	+3.3	-4.8
LT	-	-	-	-	-
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	8.00	7.53	**8.11**	+1.3	+7.6
PL	4.21	4.28	**4.28**	+1.7	+0.0
PT	2.04	2.62	**2.36**	+16	-9.9
RO	3.52	4.13	**3.81**	+8.4	-7.7
SE	6.09	5.77	**6.72**	+10	+16
SI	4.61	4.78	**4.87**	+5.6	+1.8
SK	4.86	5.90	**5.39**	+11	-8.7
UK	6.88	6.43	**7.22**	+5.0	+12



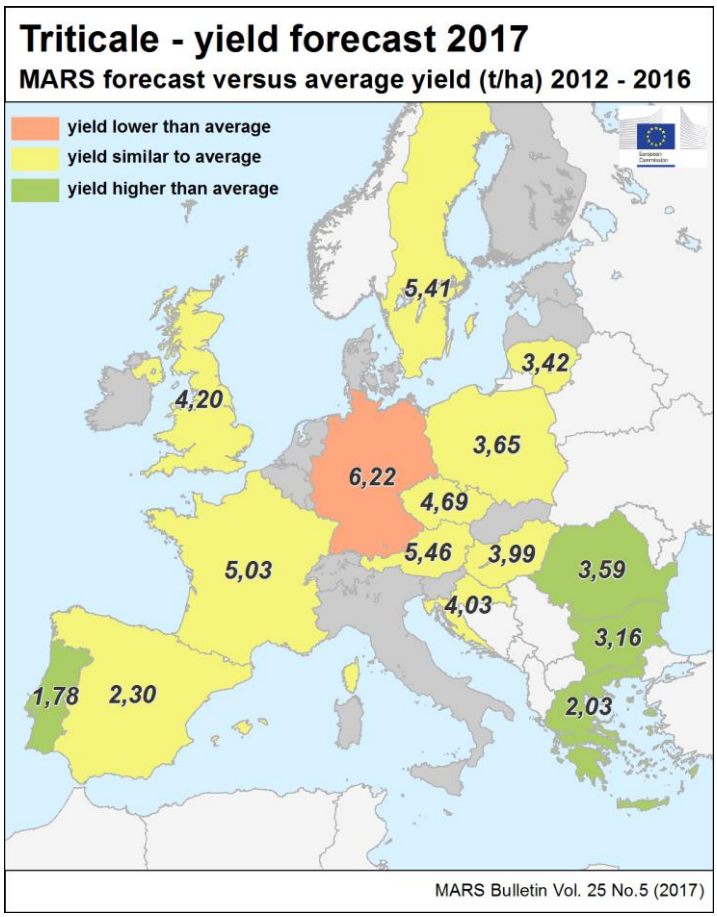
Country	GRAIN MAIZE (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	6.88	7.07	**7.15**	+3.9	+1.0
AT	9.92	11.16	**10.2**	+2.5	-8.8
BE	10.44	8.01	**11.4**	+9.0	+42
BG	5.66	5.45	**6.50**	+15	+19
CY	-	-	**-**	-	-
CZ	7.74	9.79	**7.77**	+0.4	-21
DE	9.62	8.79	**10.4**	+7.9	+18
DK	6.23	6.28	**6.42**	+3.0	+2.2
EE	-	-	**-**	-	-
ES	11.12	11.14	**11.4**	+2.6	+2.3
FI	-	-	**-**	-	-
FR	8.82	8.19	**8.82**	-0.0	+7.7
GR	10.81	10.12	**10.6**	-1.9	+4.8
HR	6.46	8.41	**6.78**	+4.9	-19
HU	6.15	8.61	**6.92**	+13	-20
IE	-	-	**-**	-	-
IT	9.45	10.35	**9.63**	+1.9	-6.9
LT	6.32	6.91	**6.26**	-1.1	-9.4
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	10.24	7.84	**11.3**	+10	+44
PL	6.33	7.17	**6.33**	-0.0	-12
PT	8.28	8.03	**8.28**	-0.1	+3.1
RO	3.65	3.49	**3.93**	+7.8	+13
SE	-	-	**-**	-	-
SI	8.00	9.54	**8.91**	+11	-6.6
SK	6.31	7.76	**6.32**	+0.1	-19
UK	-	-	**-**	-	-



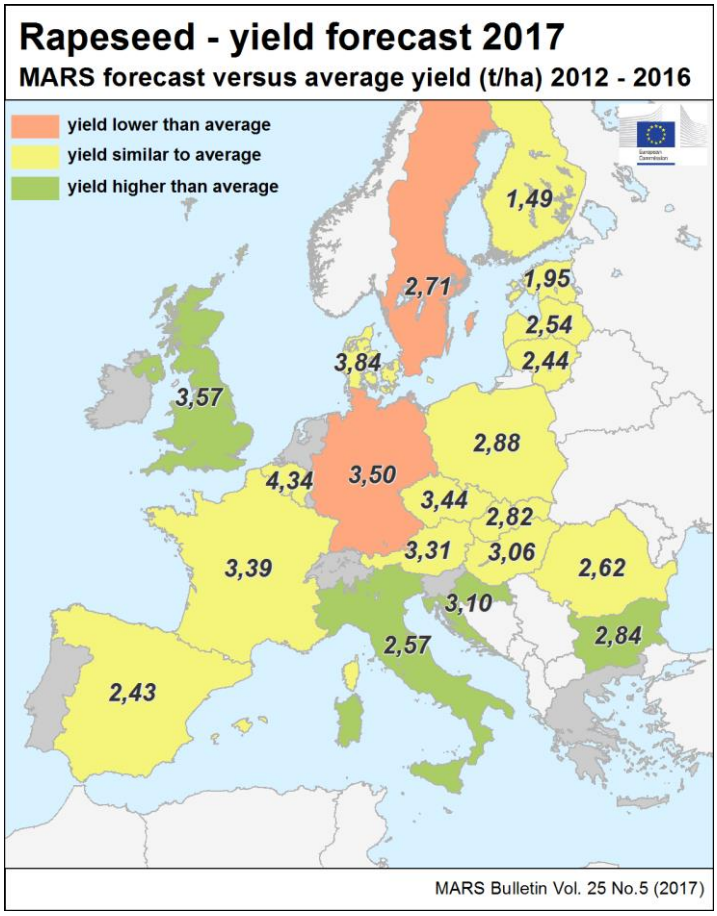
Country	RYE (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	3.89	3.89	**3.64**	-6.3	-6.2
AT	4.49	5.05	**4.67**	+3.9	-7.6
BE	-	-	**-**	-	-
BG	-	-	**-**	-	-
CY	-	-	**-**	-	-
CZ	4.88	4.98	**5.28**	+8.3	+6.1
DE	5.71	5.55	**5.25**	-8.0	-5.4
DK	5.96	5.73	**5.62**	-5.7	-2.0
EE	3.06	2.61	**2.84**	-7.3	+8.5
ES	2.01	2.50	**1.94**	-3.6	-22
FI	3.16	3.38	**2.97**	-6.1	-12
FR	4.75	3.97	**4.72**	-0.6	+19
GR	1.87	1.48	**1.94**	+3.8	+31
HR	-	-	**-**	-	-
HU	2.77	3.03	**3.03**	+9.2	+0.1
IE	-	-	**-**	-	-
IT	-	-	**-**	-	-
LT	2.44	2.38	**2.40**	-1.7	+0.6
LU	-	-	**-**	-	-
LV	3.48	3.94	**3.51**	+1.0	-11
MT	-	-	**-**	-	-
NL	-	-	**-**	-	-
PL	2.91	2.89	**2.75**	-5.5	-4.8
PT	0.85	0.90	**0.90**	+5.7	+0.1
RO	-	-	**-**	-	-
SE	6.19	6.12	**5.75**	-7.1	-6.0
SI	-	-	**-**	-	-
SK	3.70	3.78	**3.95**	+6.9	+4.6
UK	3.48	1.88	**6.31**	+81	+235



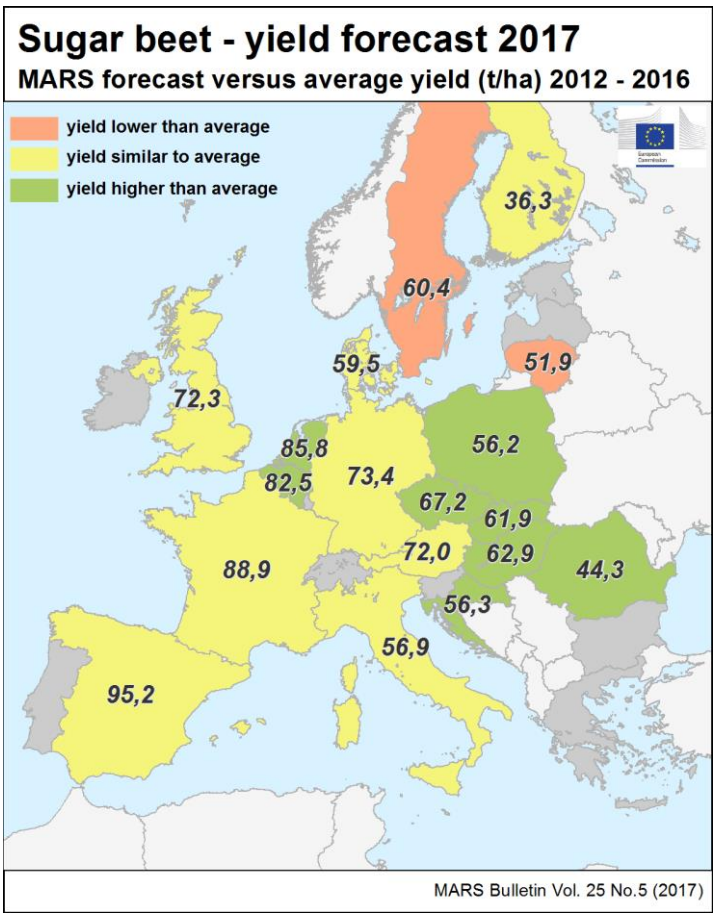
Country	TRITICALE (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	4.20	3.98	**4.14**	-1.5	+3.9
AT	5.44	5.88	**5.46**	+0.3	-7.1
BE	-	-	-	-	-
BG	2.95	3.06	**3.16**	+7.0	+3.3
CY	-	-	-	-	-
CZ	4.70	4.88	**4.69**	-0.3	-3.9
DE	6.49	6.08	**6.22**	-4.2	+2.2
DK	-	-	-	-	-
EE	-	-	-	-	-
ES	2.25	2.41	**2.30**	+2.5	-4.7
FI	-	-	-	-	-
FR	5.17	4.33	**5.03**	-2.8	+16
GR	1.75	1.75	**2.03**	+16	+16
HR	4.01	4.10	**4.03**	+0.3	-1.7
HU	3.86	4.14	**3.99**	+3.3	-3.6
IE	-	-	-	-	-
IT	-	-	-	-	-
LT	3.43	3.28	**3.42**	-0.2	+4.3
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	3.63	3.60	**3.65**	+0.6	+1.4
PT	1.53	1.95	**1.78**	+16	-8.6
RO	3.24	2.90	**3.59**	+11	+24
SE	5.61	5.23	**5.41**	-3.5	+3.5
SI	-	-	-	-	-
SK	-	-	-	-	-
UK	4.08	3.91	**4.20**	+2.9	+7.4



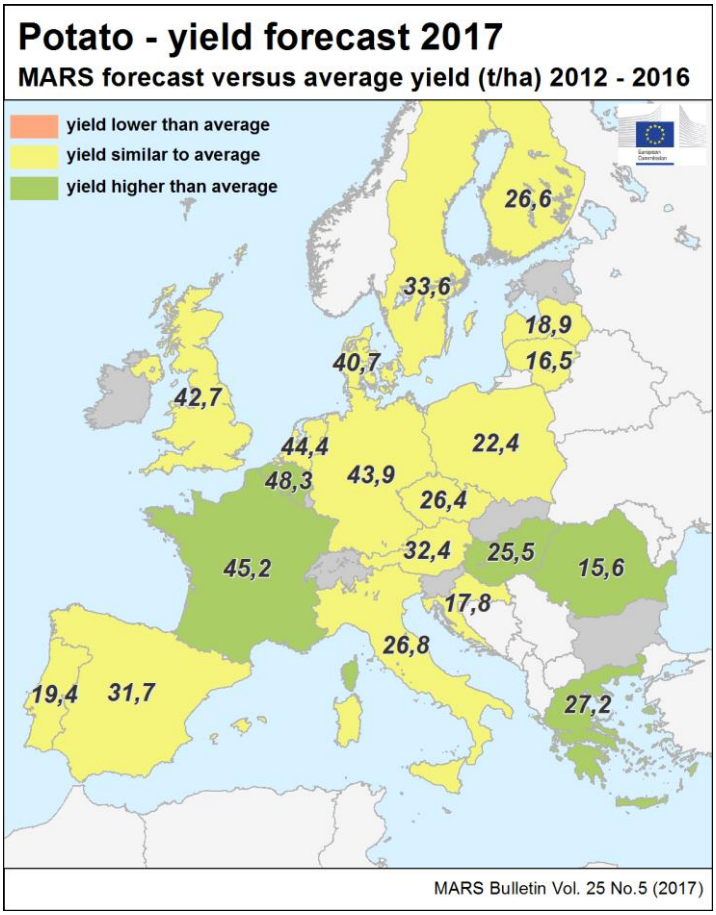
Country	RAPE AND TURNIP RAPE (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	3.25	3.07	**3.17**	-2.7	+3.0
AT	3.26	3.58	**3.31**	+1.5	-7.4
BE	4.21	3.77	**4.34**	+3.0	+15
BG	2.58	2.95	**2.84**	+10	-4.0
CY	-	-	-	-	-
CZ	3.41	3.46	**3.44**	+0.9	-0.6
DE	3.90	3.46	**3.50**	-10	+1.1
DK	3.89	3.13	**3.84**	-1.1	+23
EE	2.02	1.46	**1.95**	-3.6	+33
ES	2.36	2.58	**2.43**	+2.9	-5.8
FI	1.49	1.54	**1.49**	-0.2	-3.3
FR	3.35	3.06	**3.39**	+0.9	+11
GR	-	-	-	-	-
HR	2.88	3.11	**3.10**	+7.7	-0.1
HU	2.95	3.44	**3.06**	+3.9	-11
IE	-	-	-	-	-
IT	2.37	2.57	**2.57**	+8.6	+0.1
LT	2.39	2.60	**2.44**	+1.9	-6.3
LU	-	-	-	-	-
LV	2.61	2.83	**2.54**	-2.5	-10
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	2.88	2.69	**2.88**	+0.0	+7.3
PT	-	-	-	-	-
RO	2.54	2.84	**2.62**	+3.0	-7.7
SE	3.10	2.89	**2.71**	-13	-6.3
SI	-	-	-	-	-
SK	2.88	3.46	**2.82**	-2.3	-19
UK	3.40	3.07	**3.57**	+4.8	+16



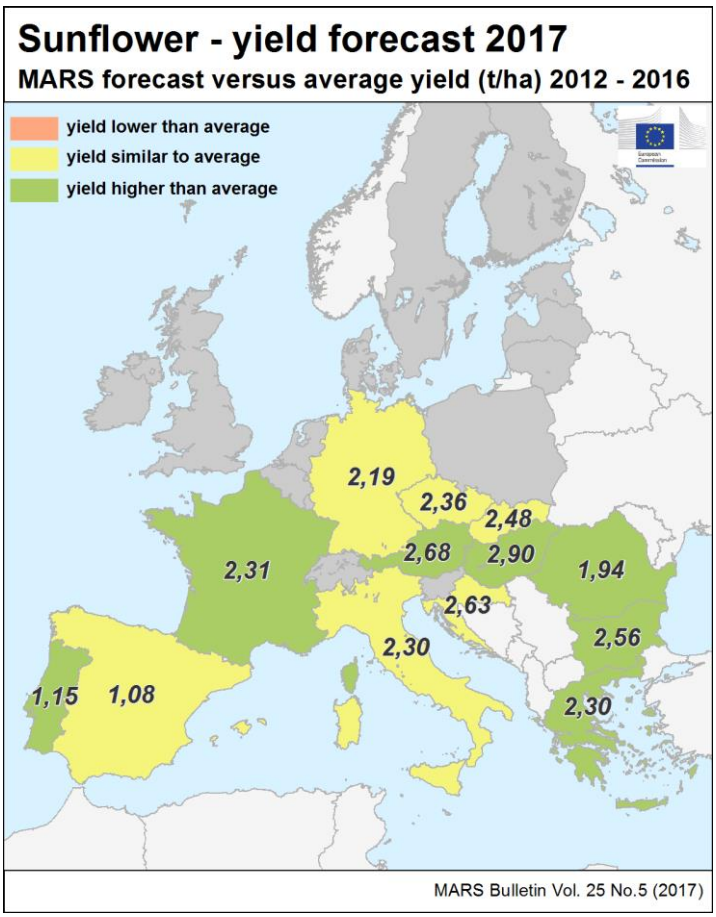
Country	SUGAR BEETS (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	71.4	71.5	**73.9**	+3.4	+3.4
AT	71.8	81.3	**72.0**	+0.2	-11
BE	77.2	72.1	**82.5**	+6.9	+14
BG	-	-	**-**	-	-
CY	-	-	**-**	-	-
CZ	64.2	67.8	**67.2**	+4.6	-0.9
DE	71.4	72.2	**73.4**	+2.8	+1.7
DK	60.9	51.3	**59.5**	-2.4	+16
EE	-	-	**-**	-	-
ES	92.5	95.7	**95.2**	+2.9	-0.5
FI	36.4	37.3	**36.3**	-0.4	-2.9
FR	87.4	83.9	**88.9**	+1.8	+6.0
GR	-	-	**-**	-	-
HR	52.1	NA	**56.3**	+8.0	NA
HU	57.2	67.5	**62.9**	+10	-6.7
IE	-	-	**-**	-	-
IT	55.6	NA	**56.9**	+2.5	NA
LT	54.1	61.3	**51.9**	-4.1	-15
LU	-	-	**-**	-	-
LV	-	-	**-**	-	-
MT	-	-	**-**	-	-
NL	80.6	77.8	**85.8**	+6.4	+10
PL	53.0	51.7	**56.2**	+6.0	+8.7
PT	-	-	**-**	-	-
RO	37.5	39.9	**44.3**	+18	+11
SE	63.9	65.0	**60.4**	-5.5	-7.1
SI	-	-	**-**	-	-
SK	56.8	70.2	**61.9**	+8.9	-12
UK	71.0	66.0	**72.3**	+1.8	+9.5



Country	POTATO (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	32.5	32.8	**33.6**	+3.5	+2.4
AT	31.4	36.2	**32.4**	+3.3	-10
BE	45.8	37.9	**48.3**	+5.4	+28
BG	-	-	**-**	-	-
CY	-	-	**-**	-	-
CZ	26.5	29.9	**26.4**	-0.5	-12
DE	43.8	43.2	**43.9**	+0.3	+1.7
DK	41.8	42.4	**40.7**	-2.8	-4.1
EE	-	-	**-**	-	-
ES	30.9	30.7	**31.7**	+2.8	+3.5
FI	26.7	27.1	**26.6**	-0.2	-1.8
FR	42.7	39.0	**45.2**	+5.7	+16
GR	25.1	27.7	**27.2**	+8.6	-1.8
HR	17.2	NA	**17.8**	+3.5	NA
HU	24.1	24.6	**25.5**	+5.7	+3.4
IE	-	-	**-**	-	-
IT	26.2	NA	**26.8**	+2.3	NA
LT	16.8	16.0	**16.5**	-2.0	+3.0
LU	-	-	**-**	-	-
LV	18.8	19.9	**18.9**	+0.3	-5.0
MT	-	-	**-**	-	-
NL	43.4	42.9	**44.4**	+2.3	+3.6
PL	22.9	23.7	**22.4**	-1.9	-5.4
PT	18.7	18.8	**19.4**	+3.8	+3.0
RO	14.3	14.2	**15.6**	+8.6	+9.3
SE	34.3	35.7	**33.6**	-1.9	-5.9
SI	-	-	**-**	-	-
SK	-	-	**-**	-	-
UK	42.1	45.0	**42.7**	+1.6	-5.0



Country	SUNFLOWER (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
EU	1.94	2.06	**2.14**	+10	+3.9
AT	2.53	3.29	**2.68**	+6.2	-19
BE	-	-	-	-	-
BG	2.15	2.20	**2.56**	+19	+16
CY	-	-	-	-	-
CZ	2.32	2.85	**2.36**	+1.4	-17
DE	2.19	2.17	**2.19**	+0.0	+0.9
DK	-	-	-	-	-
EE	-	-	-	-	-
ES	1.05	0.99	**1.08**	+2.9	+8.9
FI	-	-	-	-	-
FR	2.17	2.12	**2.31**	+6.2	+8.9
GR	1.95	2.11	**2.30**	+18	+9.0
HR	2.55	2.81	**2.63**	+2.9	-6.5
HU	2.55	2.95	**2.90**	+14	-1.6
IE	-	-	-	-	-
IT	2.26	2.42	**2.30**	+1.8	-5.1
LT	-	-	-	-	-
LU	-	-	-	-	-
LV	-	-	-	-	-
MT	-	-	-	-	-
NL	-	-	-	-	-
PL	-	-	-	-	-
PT	0.93	1.30	**1.15**	+24	-12
RO	1.83	1.92	**1.94**	+5.8	+0.8
SE	-	-	-	-	-
SI	-	-	-	-	-
SK	2.47	2.94	**2.48**	+0.4	-16
UK	-	-	-	-	-



Note: Yields are forecast for crops with more than 10000 ha per country

Sources: 2012-2017 data come from DG AGRICULTURE short term Outlook data (dated April 2017, received on 04/05/2017), EUROSTAT Eurobase (last update: 29/04/2017) and EES (last update: 28/10/2016)

2017 yields come from MARS CROP YIELD FORECASTING SYSTEM (output up to 20/05/2017)

NA = Data not available.

Country	WHEAT (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
BY	3.66	3.71	**3.78**	+3.2	+1.8
DZ	1.61	1.45	**1.46**	-9.8	+0.7
MA	1.75	1.18	**1.97**	+13	+68
TN	1.93	1.85	**2.05**	+6.2	+11
TR	2.69	2.71	**2.77**	+3.0	+2.3
UA	3.71	4.32	**4.28**	+15	-1.0

Country	BARLEY (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
BY	3.44	3.50	**3.58**	+4.2	+2.3
DZ	1.39	1.20	**1.17**	-16	-2.5
MA	1.07	0.51	**1.22**	+14	+138
TN	1.19	1.34	**1.57**	+32	+16
TR	2.63	2.48	**2.72**	+3.4	+9.6
UA	2.75	3.41	**3.25**	+18	-4.8

Country	GRAIN MAIZE (t/ha)				
	Avg 5yrs	2016	MARS 2017 forecasts	%17/5yrs	%17/16
BY	5.26	5.33	**5.43**	+3.3	+1.9
DZ	-	-	**-**	-	-
MA	-	-	**-**	-	-
TN	-	-	**-**	-	-
TR	8.83	9.42	**9.60**	+8.6	+1.9
UA	5.84	6.60	**6.00**	+2.6	-9.1

Note: Yields are forecast for crops w ith more than 10000 ha per country

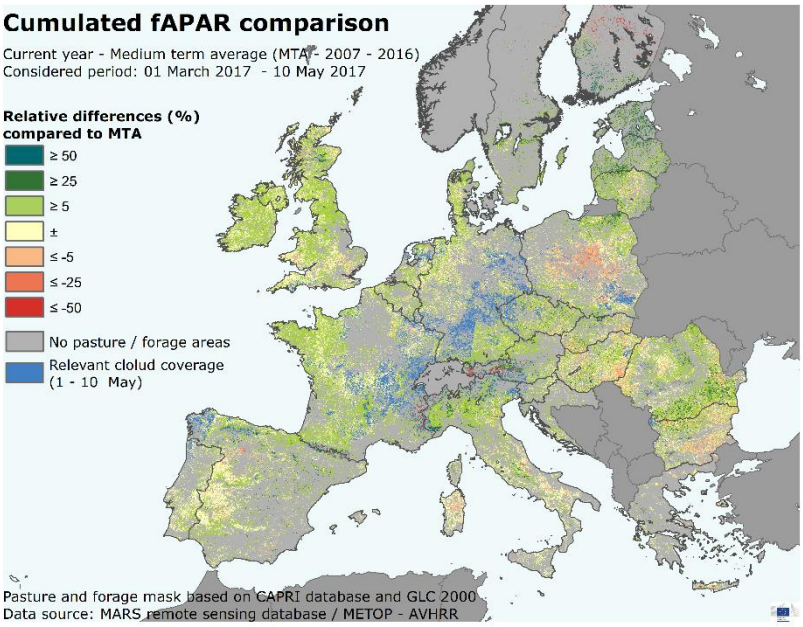
Sources: 2012-2016 data come from USDA, DSASI-MADR Algeria , INRA Maroc,CNCT Tunisie,Turkish Statistical Institute (TurkStat), EUROSTAT Eurobase (last update: 29/04/2017),State Statistics Service of Ukraine, FAO and PSD-online

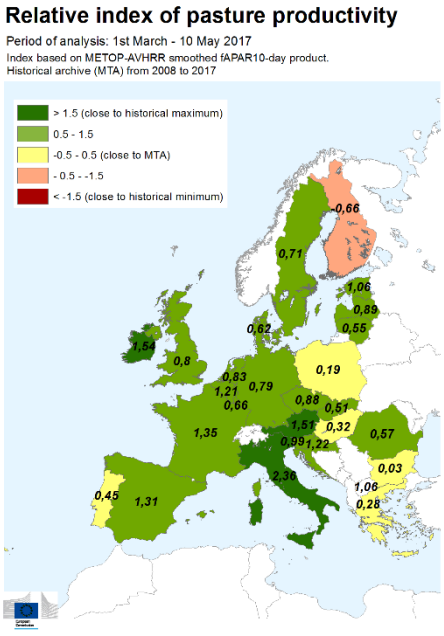
2017 yields come from MARS CROP YIELD FORECASTING SYSTEM (output up to 20/05/2017)

5. Pastures in Europe – Regional monitoring

Cold conditions slow down pasture growth in central Europe and Baltic countries

A cold spell in the second half of April affected most of Europe, after a rather mild end of winter. These cold conditions led to a decrease in the vegetative growth of pastures in Germany, Poland, and the Baltic countries. In the UK, France and Spain, grasslands are now suffering water stress after a favourable end of winter.





Methodological note

The relative index of pasture productivity is a synthetic indicator of biomass formation based on the integration of the fAPAR (fraction of absorbed photosynthetically active radiation) remote sensing product of pasture areas at country level over a period of interest (in this bulletin, from 1 March to 10 May). The spatial aggregation from remotely sensed image pixels to a country-level index was made using a pastures mask from the Common Agricultural Policy Regionalised Impact (CAPRI, http://www.capri-model.org) model. The index shows the relative position of the current season within the historical series from 2008 to 2016, and its values range approximately from -3 to 3. A value of 0 indicates that biomass production in the current season is similar to the long-term average. Values higher than 2 and below -2 indicate that biomass production in the current season is close to, respectively, the historical maximum and minimum of the period 2008-2016.

Dry conditions in the Iberian Peninsula, favourable season in northern Italy

Temperatures have been unusually mild since February in **Spain** and **Portugal**, leading to a rapid initial growth of pastures in the first quarter of the year. These high temperatures favoured exceptionally high vegetation growth rates from January to mid-April in pasture areas, particularly in northern Spain (*Asturias, Cantabria,* north of *Castilla y León*). Nevertheless, precipitation has been rather scarce, especially in April, which led to an important decrease in photosynthetic activity from mid-April onwards. Although remote sensing still indicates positive pasture productivity in Spain, the outlook for the coming month is unfavourable. In Portugal, grasslands growth in the *Dehesa* is close to the average.

The status of pastures in northern **Italy** is extremely positive. The pasture areas of *Piemonte*, *Lombardia* and *Veneto* exhibit unusually high biomass formation levels, thanks to the high temperatures registered from February to mid-April. Moreover, abundant rainfall in the first week of May contributed to the timely emergence of fodder maize. Only in the south of the country (*Puglia*, *Basilicata*, *Campania*) and the islands (*Sardegna*, *Sicilia*) is the lack of substantial precipitation since mid-February significantly limiting grasslands growth, after a rather humid winter.

Low soil moisture levels in pasture areas of north-western Europe

The start of the growing season has been favourable in the **UK** and **Ireland**. Unusually mild temperatures from the end of March to mid-May boosted vegetative growth in the main pasture areas. Biomass formation in the UK is above the long-term average, but precipitation in April and the first half of May was rather scarce, and soil moisture levels are now low. If these dry conditions persist, the outlook for pasture growth for the end of May and June will be unfavourable. In Ireland, by contrast, biomass growth in the coming weeks will be positive, thanks to the abundant rainfall registered in the second week of May.

In northern **France** and the **Benelux** region, the status of the pasture areas is similar to that of the UK: the absence of significant precipitation in April dramatically decreased soil moisture levels. In the north-west (*Bretagne*, *Normandie*), however, moderate precipitation in the first half of May prevented a strong decrease in photosynthetic activity in grasslands. In the north-east (*Lorraine*, *Champagne-Ardenne,* most of Belgium), dry conditions are persisting, and the outlook for the coming weeks is below average. By contrast, the situation is more favourable in the southern half of France (*Limousin*, *Auvergne*, *Rhône-Alpes*), where precipitation in the past two months was sufficient to maintain soil moisture at adequate levels. Biomass production since February is substantially above the average, and no significant water constraints are expected during the second half of May.

Grasslands growth limited by low temperatures in central Europe

Weather conditions during February and March were rather favourable in **Germany**, the **Czech Republic**, **Slovakia** and **Austria**, with temperatures above the long-term average. Temperatures dropped significantly in mid-April, and have since remained unusually low. The period between 16 and 20 April was especially cold, with minimum temperatures close to, or even below, 0°C.

Overall, that status of pastures remains positive in all four countries. Biomass production in the main grassland areas was substantially above the average before mid-April, and, in the coming month, will mostly depend on how fast temperatures recover in the second half of May. As precipitation in the past three months was close to the average, no significant water stress episodes are expected in the short term.

Low temperatures constrained pasture growth in the Baltic Sea area

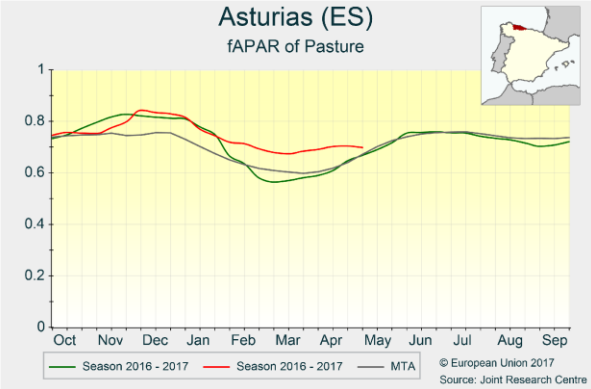
The first quarter of the year was characterised by unusually mild conditions in the Baltic Sea area (**Denmark**, **Sweden**, **Finland**, **Latvia**, **Lithuania**, **Estonia** and **Poland**). Since mid-April, temperatures decreased sharply and remained 3-4°C below the long-term average. Two episodes (15-20 April and 8-10 May) were particularly cold, with daily averages close to 0°C in the whole area.

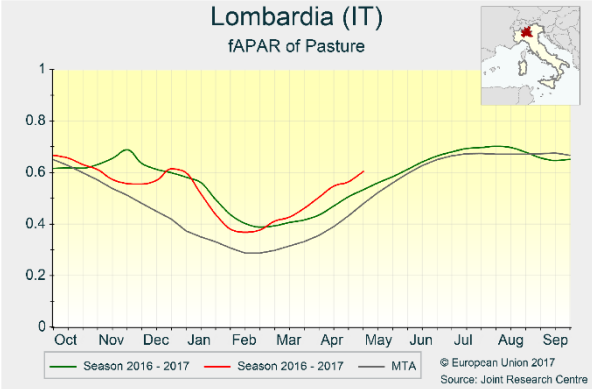
Biomass formation rates in the main pasture areas were significantly above average in February and March, and then fell sharply as a consequence of the cold spell. Grasslands growth was particularly affected in central Poland (identified in red in the cumulated fAPAR map) and in the centre-south of Finland, where the biomass formation levels are below average. In Latvia, Lithuania, Estonia and Sweden, pasture productivity from March to mid-May remains above the average, mainly due to the exceptionally high growth rates before the cold spell. In Denmark, the effects of the cold spell were minor, since temperatures increased progressively to seasonal values in the first half of May. A possible recovery of pasture growth during the second half of May will be entirely determined by temperatures. As cumulated precipitation since March has been significantly above the long-term average, soil moisture levels are high in the whole area, and water stress should not occur before mid-June.

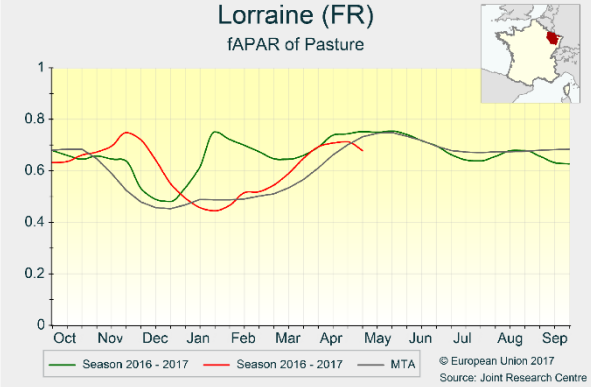
Average biomass production in south-eastern Europe

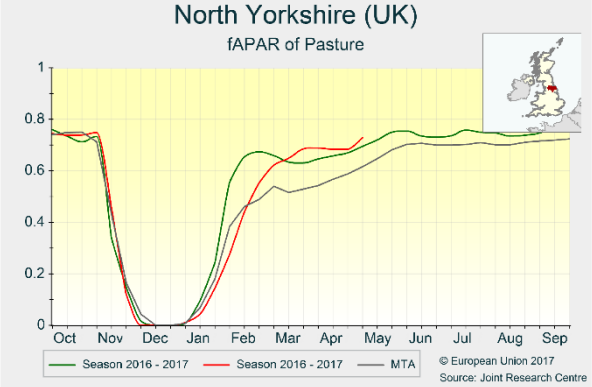
In **Hungary** and **Romania**, pasture productivity is slightly above the long-term average. Temperatures since mid-March, where the growing season of grasslands starts after the winter, have been close to the average. Moreover, rainfall from mid-April was abundant, supporting average production rates in the main producing areas. The expectations for the second half of May are positive.

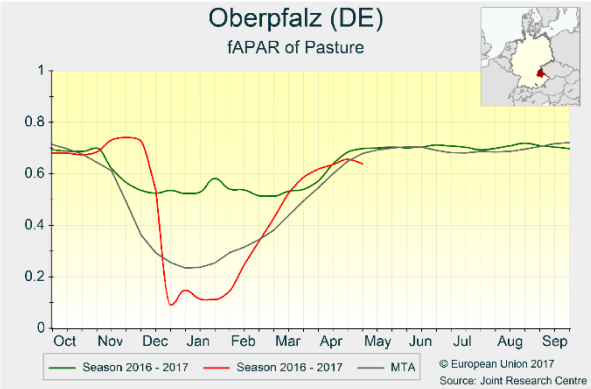
In **Bulgaria**, exceptionally low temperatures in January (with daily averages sometimes below -5°C) and snow cover that persisted until mid-February created an important delay to the development of pastures. With the exception of a cold period in the third week of April, above-average temperatures since March led to a progressive increase in growth rates, and biomass production in the main pasture areas is currently close to the average. Moreover, soil moisture levels are adequate, thanks to the abundant rainfalls registered since mid-April, depicting a favourable outlook until mid-June.

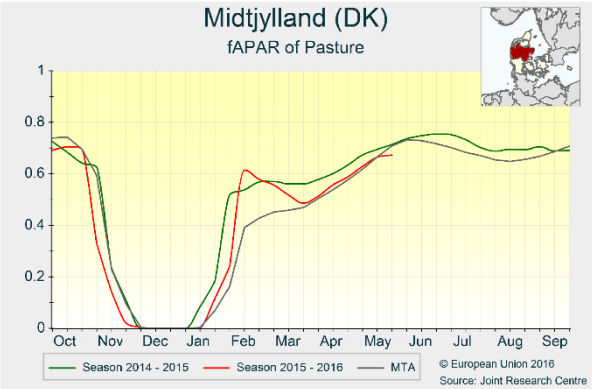


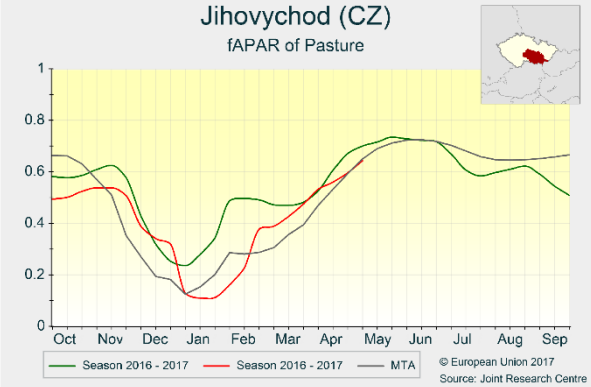


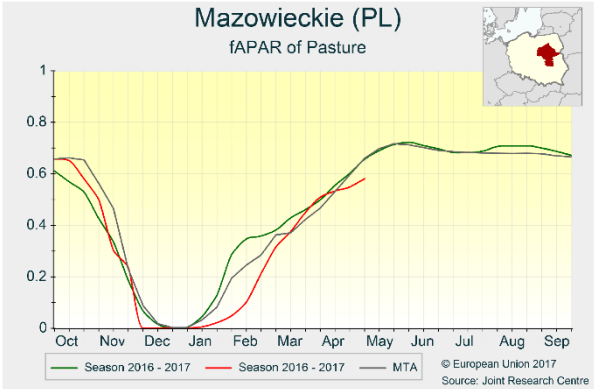


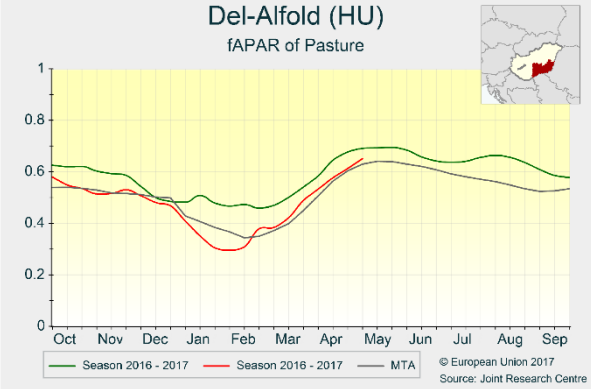


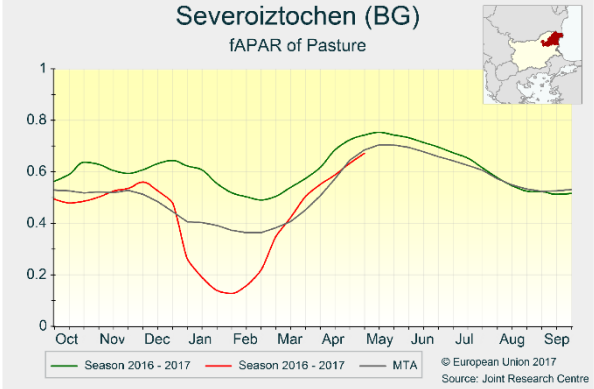





Jihovychod (CZ)
fAPAR of Pasture
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2016 - 2017
Season 2016 - 2017
MTA
© European Union 2017
Source: Joint Research Centre

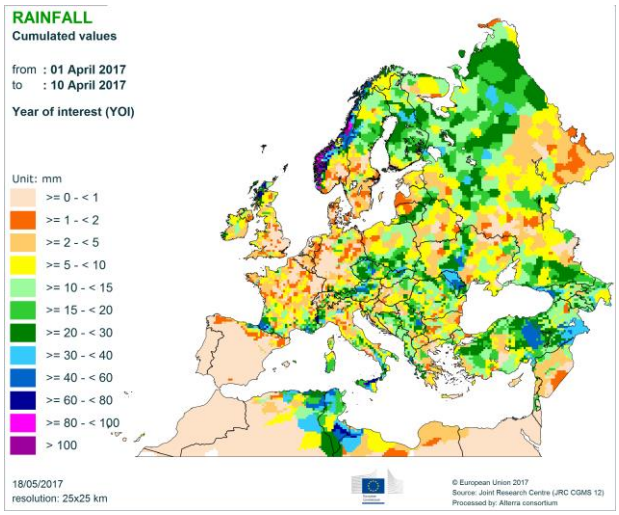

Mazowieckie (PL)
fAPAR of Pasture
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2016 - 2017
Season 2016 - 2017
MTA
© European Union 2017
Source: Joint Research Centre

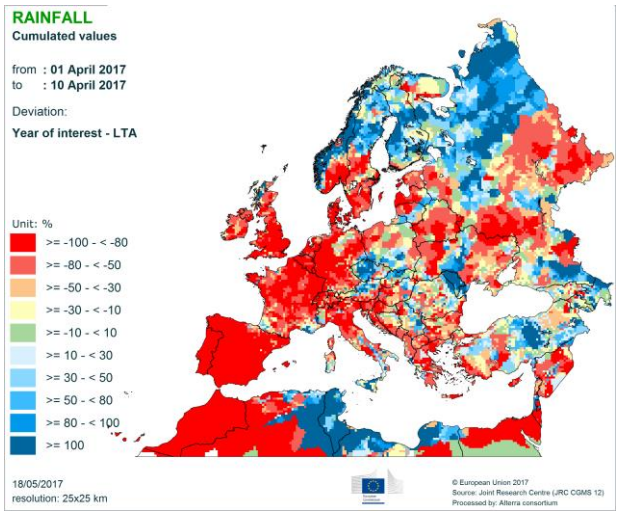

Del-Alfold (HU)
fAPAR of Pasture
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2016 - 2017
Season 2016 - 2017
MTA
© European Union 2017
Source: Joint Research Centre

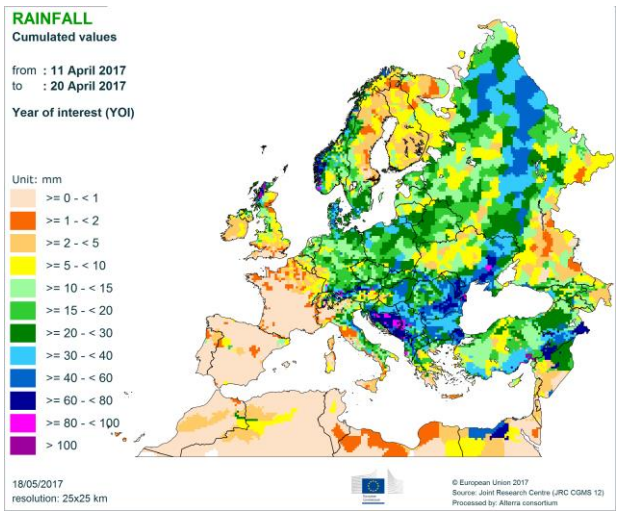

Severoiztochen (BG)
fAPAR of Pasture
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2016 - 2017
Season 2016 - 2017
MTA
© European Union 2017
Source: Joint Research Centre

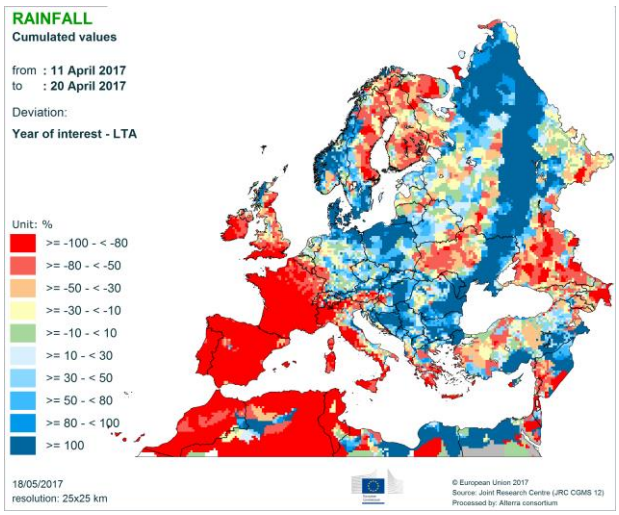
6. Atlas

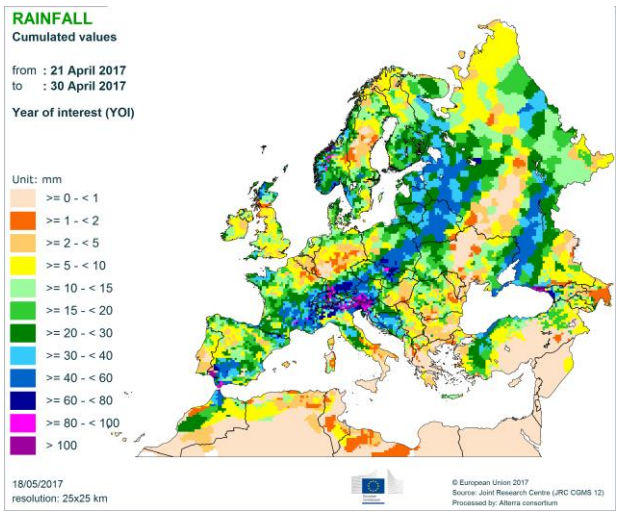
Precipitation

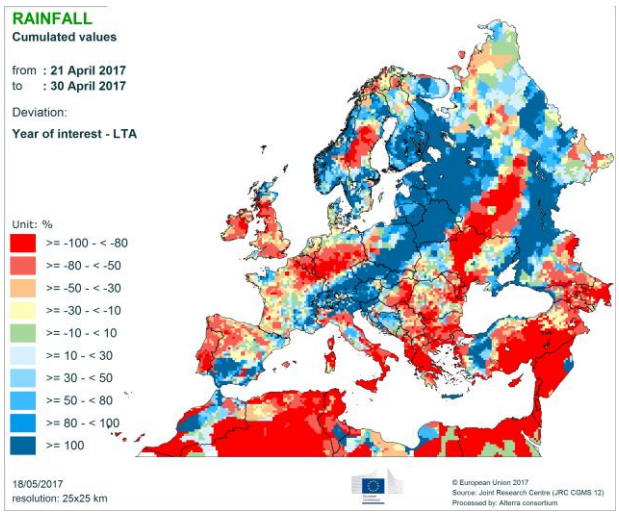


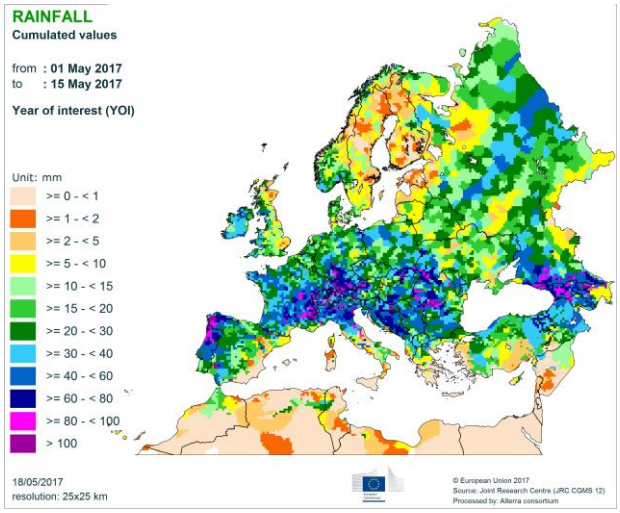


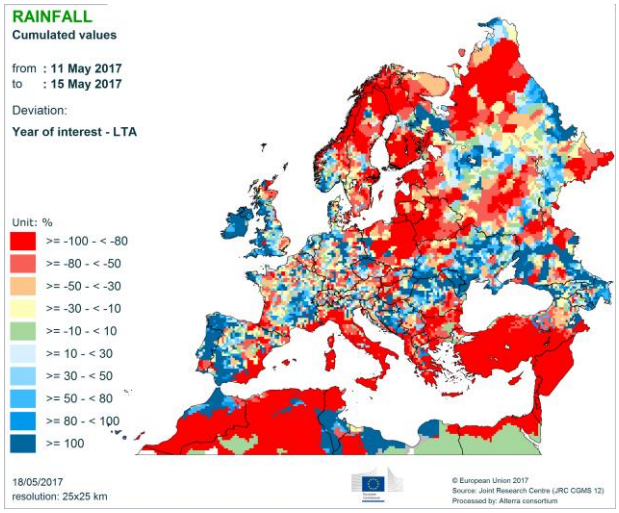


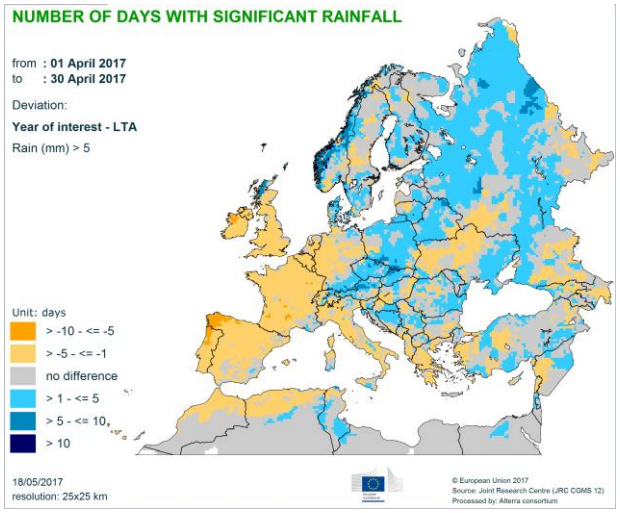


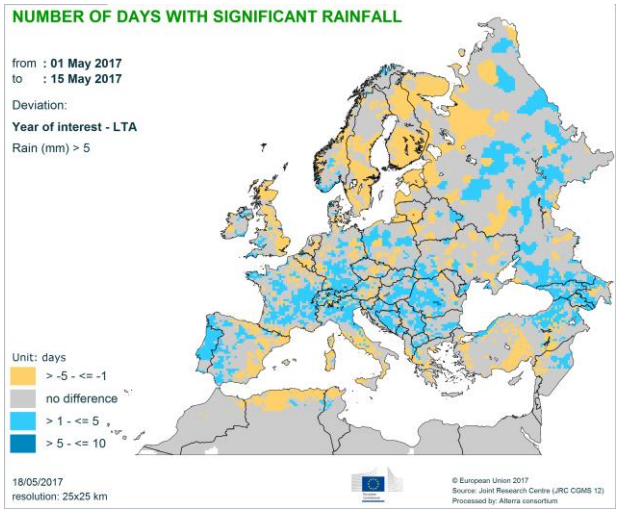




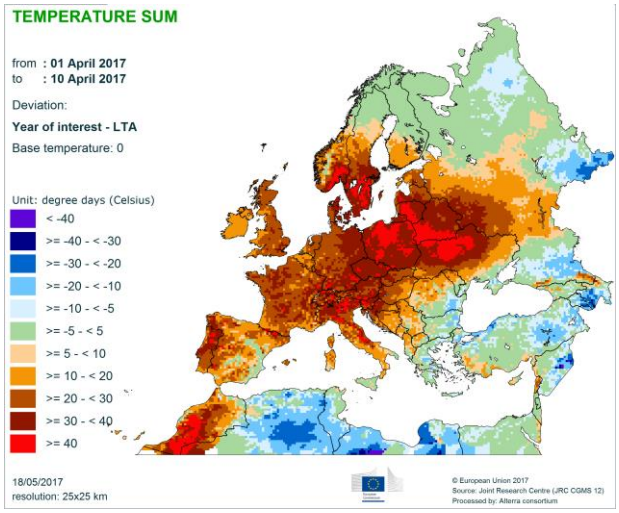

RAINFALL
Cumulated values
from : 01 May 2017
to : 15 May 2017
Year of interest (YOI)
Unit: mm
>= 0 - < 1
>= 1 - < 2
>= 2 - < 5
>= 5 - < 10
>= 10 - < 15
>= 15 - < 20
>= 20 - < 30
>= 30 - < 40
>= 40 - < 60
>= 60 - < 80
>= 80 - < 100
> 100
18/05/2017
resolution: 25x25 km
© European Union 2017
Source: Joint Research Centre (JRC CGMS 12)
Processed by: Alterra consortium

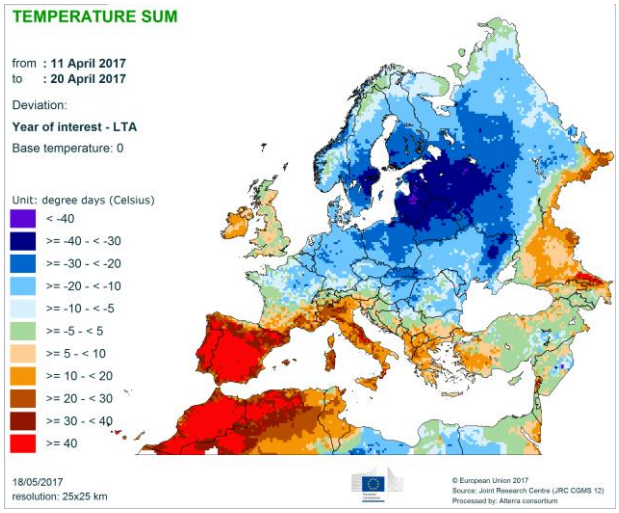

RAINFALL
Cumulated values
from : 11 May 2017
to : 15 May 2017
Deviation:
Year of interest - LTA
Unit: %
>= -100 - < -80
>= -80 - < -50
>= -50 - < -30
>= -30 - < -10
>= -10 - < 10
>= 10 - < 30
>= 30 - < 50
>= 50 - < 80
>= 80 - < 100
>= 100
18/05/2017
resolution: 25x25 km
© European Union 2017
Source: Joint Research Centre (JRC CGMS 12)
Processed by: Alterra consortium

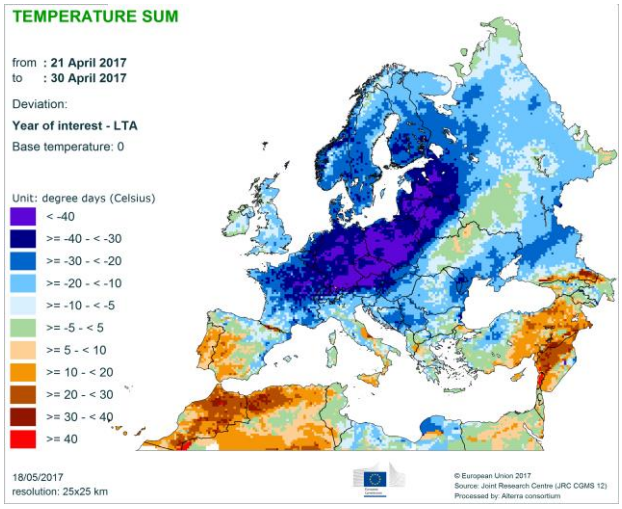

NUMBER OF DAYS WITH SIGNIFICANT RAINFALL
from : 01 April 2017
to : 30 April 2017
Deviation:
Year of interest - LTA
Rain (mm) > 5
Unit: days
> -10 - <= -5
> -5 - <= -1
no difference
> 1 - <= 5
> 5 - <= 10
> 10
18/05/2017
resolution: 25x25 km
© European Union 2017
Source: Joint Research Centre (JRC CGMS 12)
Processed by: Alterra consortium

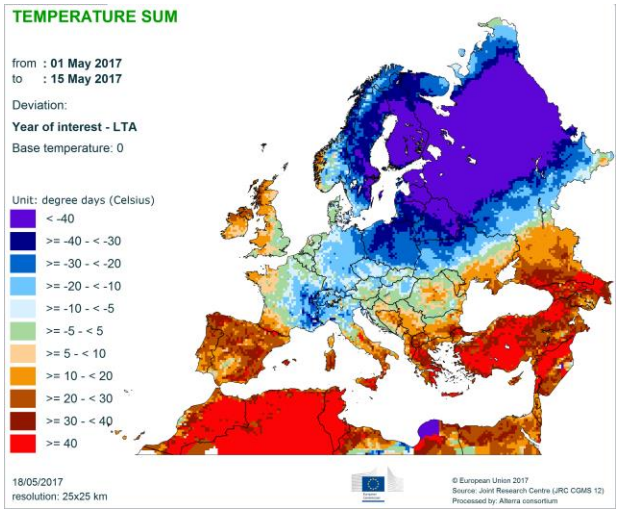

NUMBER OF DAYS WITH SIGNIFICANT RAINFALL
from : 01 May 2017
to : 15 May 2017
Deviation:
Year of interest - LTA
Rain (mm) > 5
Unit: days
> -5 - <= -1
no difference
> 1 - <= 5
> 5 - <= 10
18/05/2017
resolution: 25x25 km
© European Union 2017
Source: Joint Research Centre (JRC CGMS 12)
Processed by: Alterra consortium

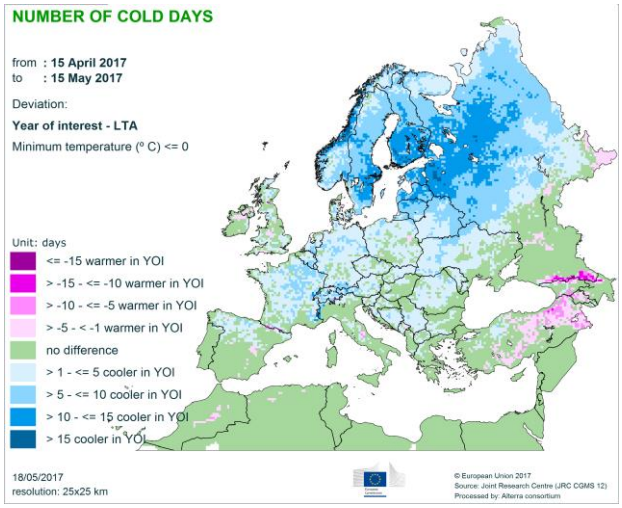
Temperature regime

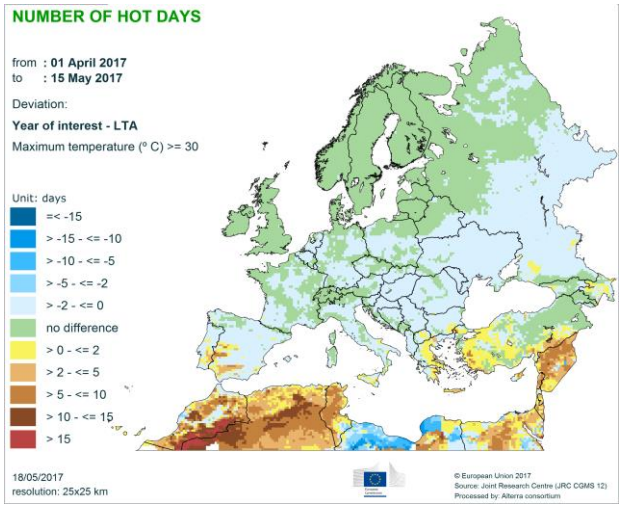




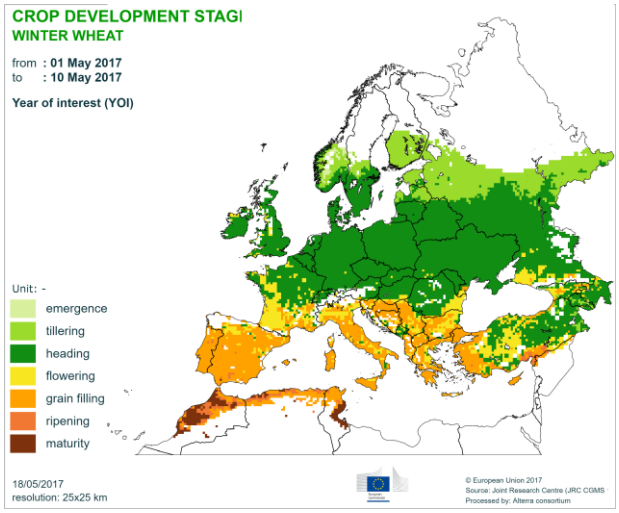


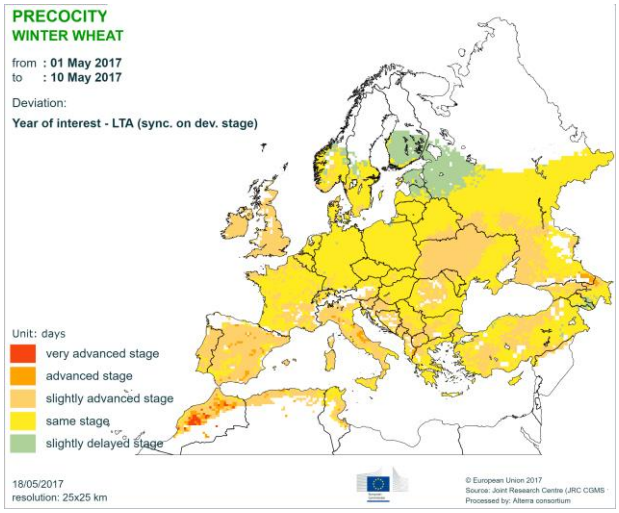


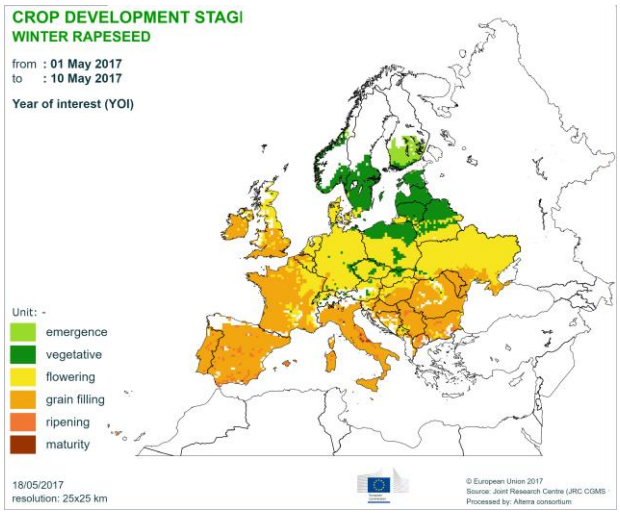


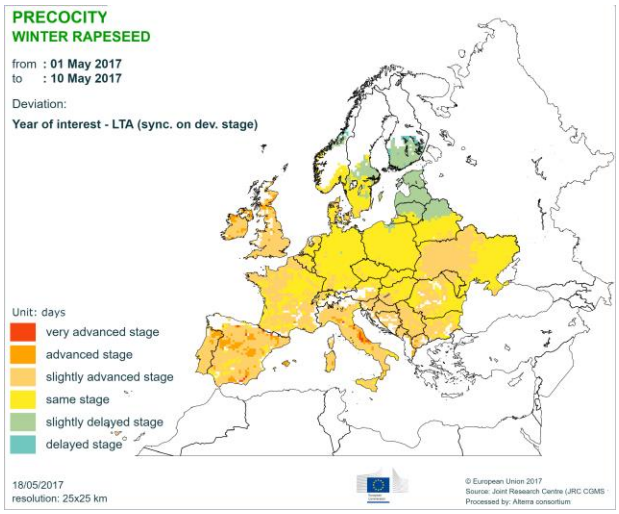


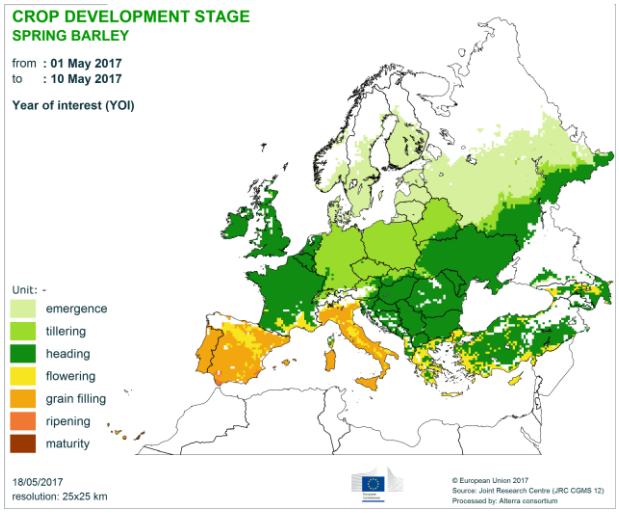
Crop development stages and precocity

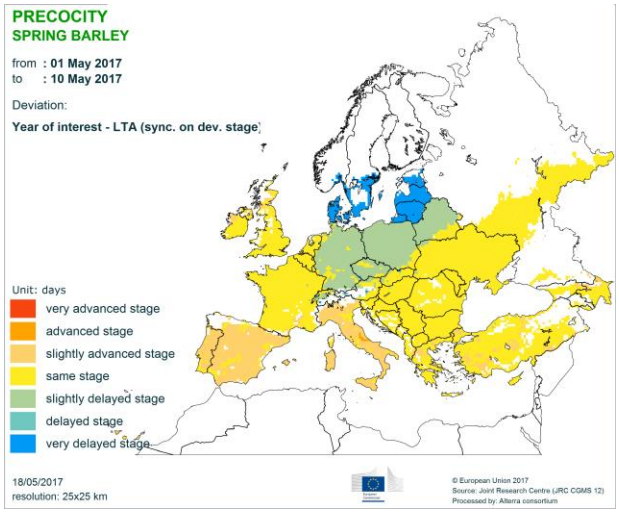




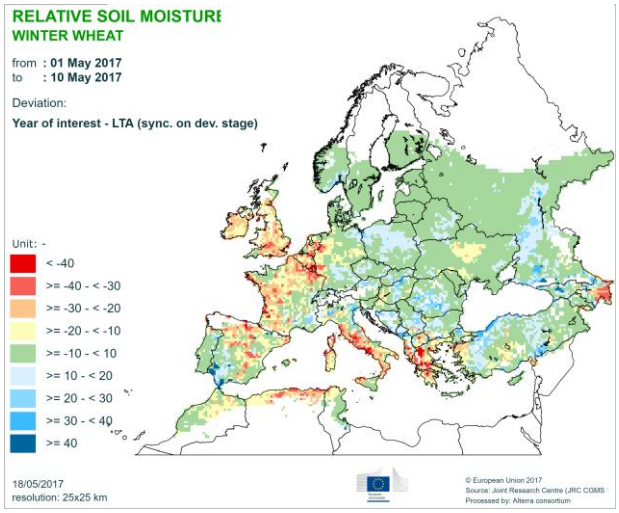


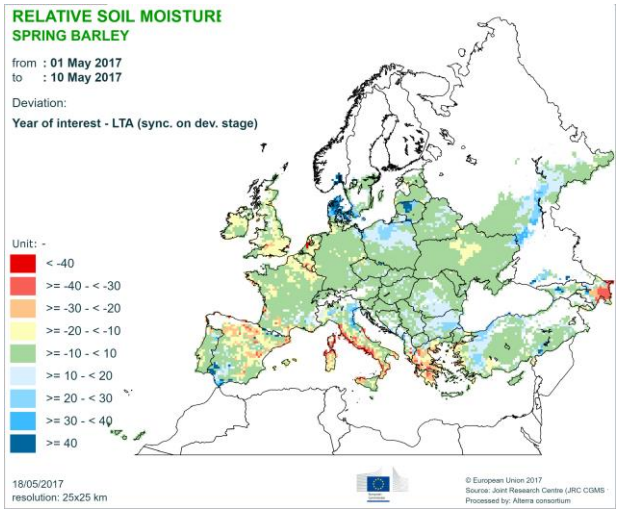




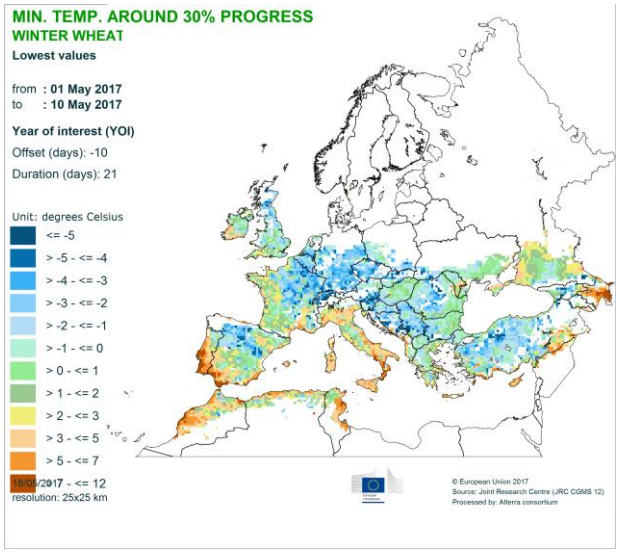


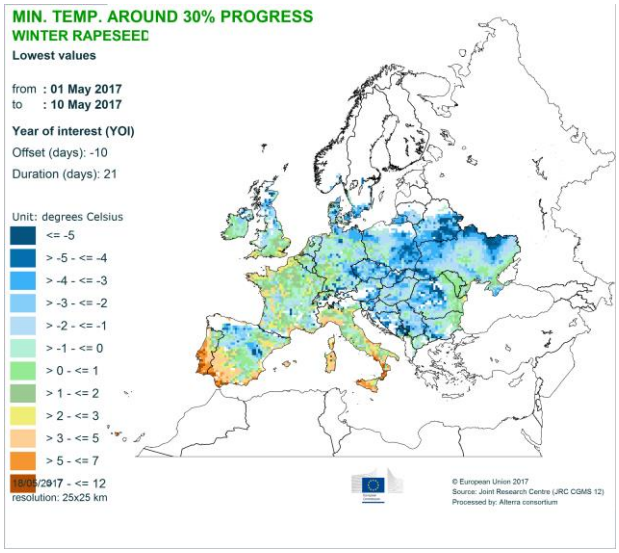
Relative soil moisture



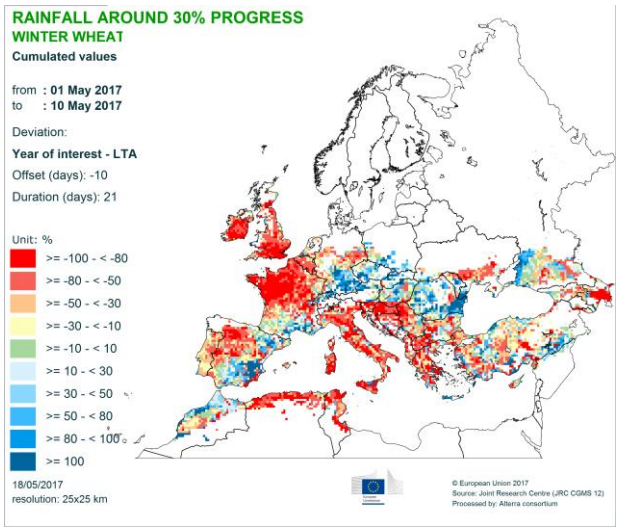


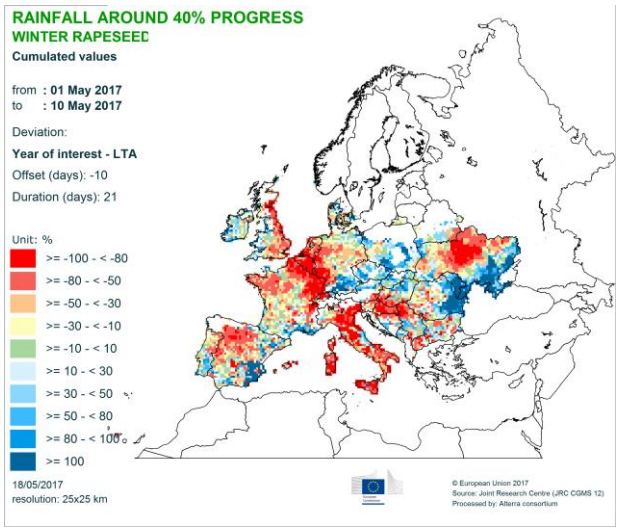
Minimum temperature around crops development





Precipitation around crops development





JRC MARS Bulletins 2017

Date	Publication	Reference
23 Jan	Agromet. analysis	Vol. 25 No. 1
20 Feb	Agromet analysis	Vol. 25 No. 2
27 Mar	Agromet analysis, yield forecast	Vol. 25 No. 3
24 Apr	Agromet analysis, remote sensing, yield forecast, sowing conditions	Vol. 25 No. 4
22 May	Agromet analysis, remote sensing, yield forecast, pasture analysis,	Vol. 25 No. 5
26 Jun	Agromet analysis, remote sensing, yield forecast, pasture update, rice analysis	Vol. 25 No. 6
24 Jul	Agromet analysis, remote sensing, yield forecast, pasture update	Vol. 25 No. 7
21 Aug	Agromet analysis, remote sensing, yield forecast, pasture update, rice analysis	Vol. 25 No. 8
25 Sep	Agromet analysis, remote sensing, yield forecast	Vol. 25 No 9
23 Oct	Agromet analysis, remote sensing, yield forecast,	Vol. 25 No. 10
27 Nov	Agromet analysis and yield forecast, sowing conditions	Vol. 25 No. 11
18 Dec	Agromet analysis	Vol. 25 No. 12

Mission statement: As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.

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MARS stands for Monitoring Agricultural Resources

Technical note:

The long-term average (LTA) used within this Bulletin as a reference is based on an archive of data covering 1975-2016.